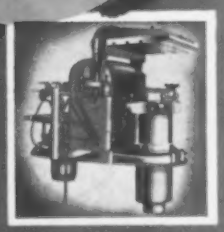
March, 1949

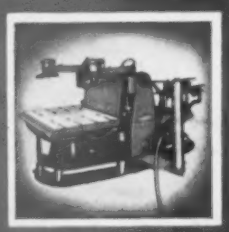
THE FOUNDRY

wherever metals are cast...

STAR PERFORMERS

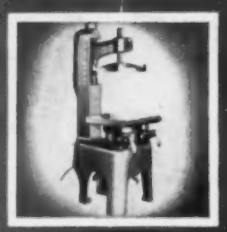


Jolt Rollover Draw, Model A

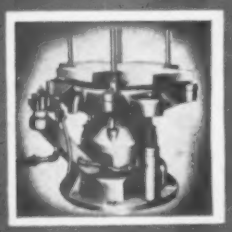


Jolt Rollover Draw, Model SA

Jolt Pin Lift, Model AJS (portable)



Jolt Squeeze, Model 10-JX (stationary)



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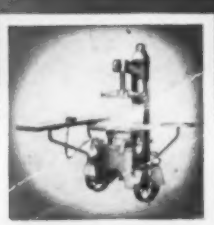

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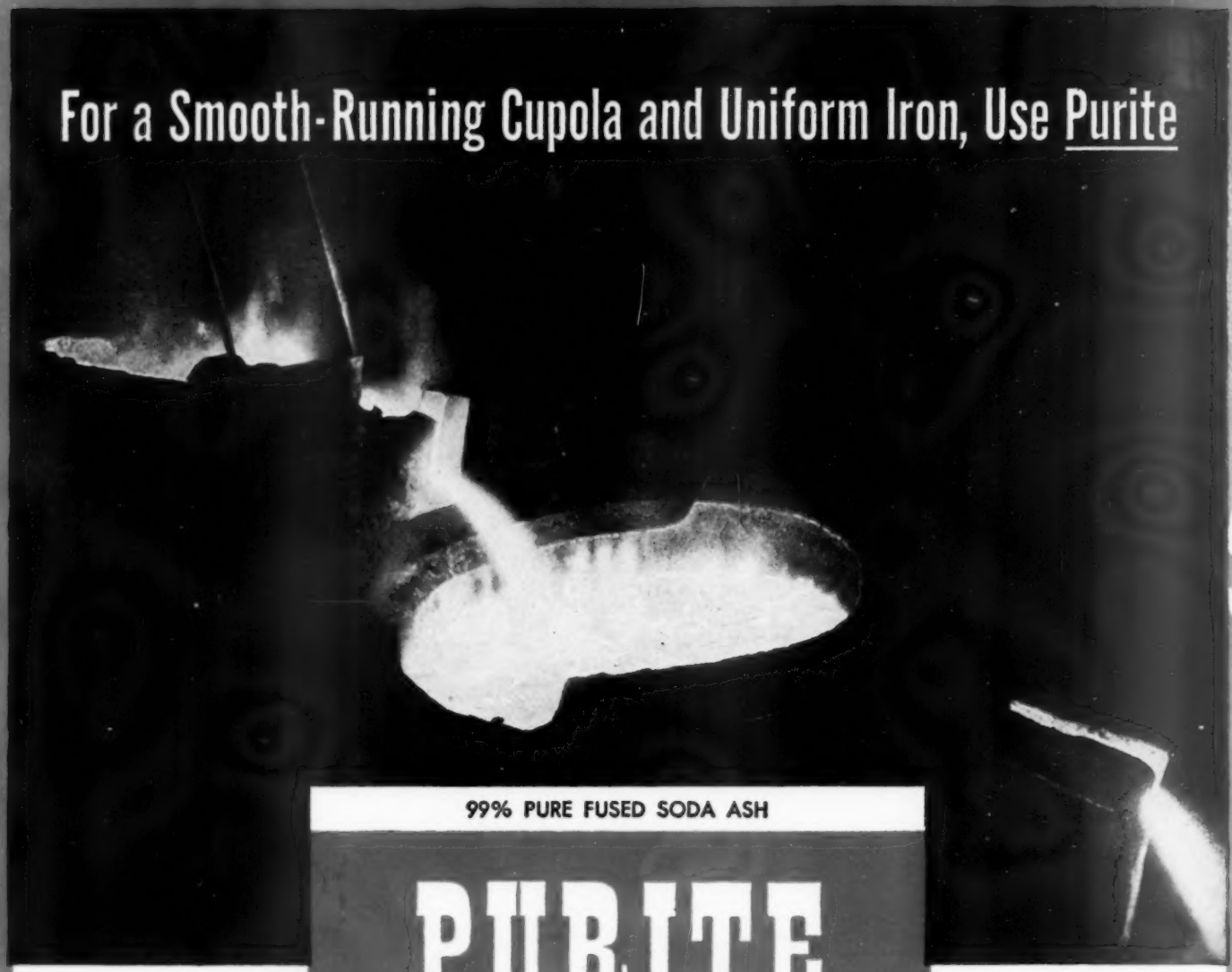

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THE FOUNDRY

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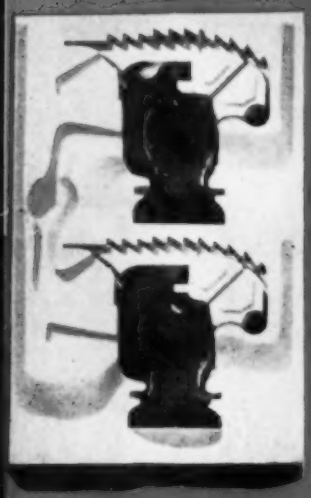
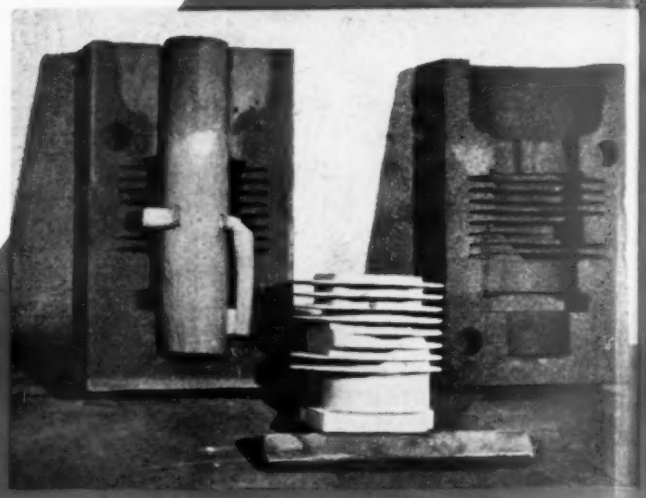


"BEFORE" . . . . . "AFTER"

his double-gated core mold is poured in magnesium . . . weighs .1 lbs. . . . and the gear box is used in portable power saws. lote the excellent finish on this casting. LINOIL cores are used the Robert Mitchell Company's foundry for special alloys, luminum, magnesium, and general gray iron castings . . . with niform success on all jobs.



Cope, drag, and centre core of LINOIL-bonded core mold . . . for precision cylinder block used in portable power saws. Castings are poured in either aluminum, at 1.75 lbs., or gray iron, at 4.3 lbs. . . . LINOIL core molds are dependable for both metals. Note the smooth surfaces and accuracy of detail on core mold and casting fins . . . one reason to specify LINOIL.

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Werner G. Smith Ltd.
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Toronto, Ontario.

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I do not hesitate to recommend your core oil as I know it will always be helpful to any foundryman who tries it. I have always enjoyed the good service and the quality of your product.

Sincerely yours,

O.L. Voisard

O. L. Voisard
(Superintendent of Foundry Division)

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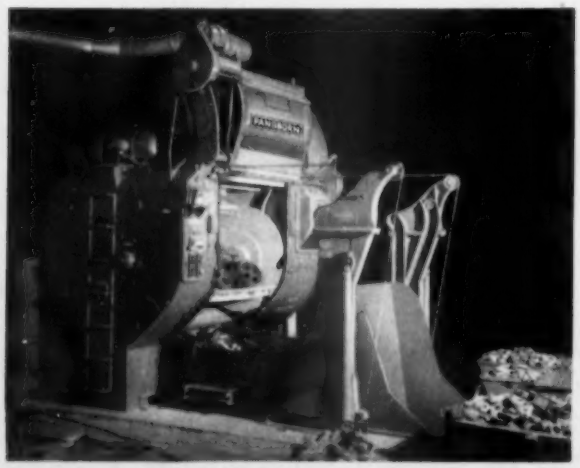

Pangborn ROTOBLAST Barrels give top efficiency in batch method cleaning. They're famous for their cost-slashing performance due to exclusive Pangborn rocker barrel action which turns the work for complete cleaning on all sides while under the blast stream. Automatic abrasive recovery mechanism saves abrasive... saves you money. Pangborn's automatic loading device saves time and effort in loading. Pangborn ROTOBLAST Barrels are available in capacities of 3½, 7, 14, 17½, 21 and 28 cubic feet.

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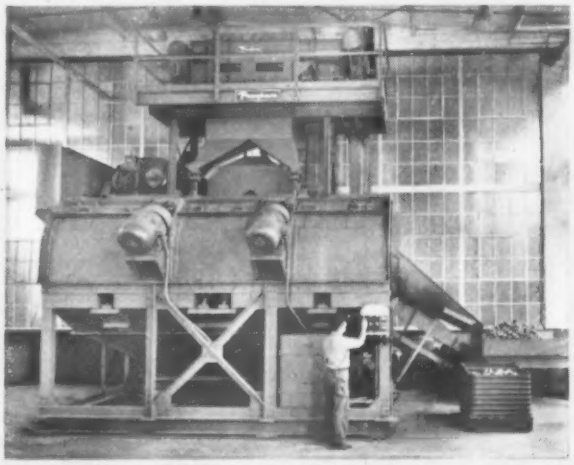

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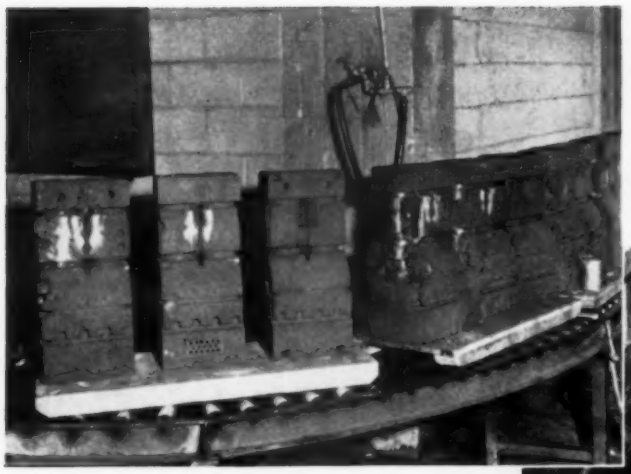
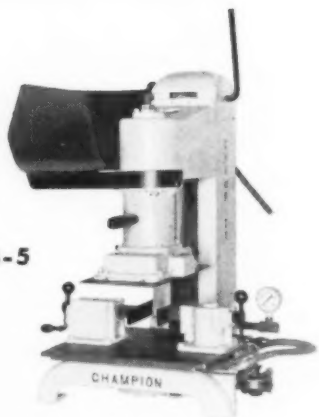


Champion CB18 Core Blower at Oliver Farm Equipment Company's foundry at Charles City, Iowa. Six similar sections blown on this machine form the core of a six cylinder gasoline engine casting, used in the power plant of the latest type farm tractor.

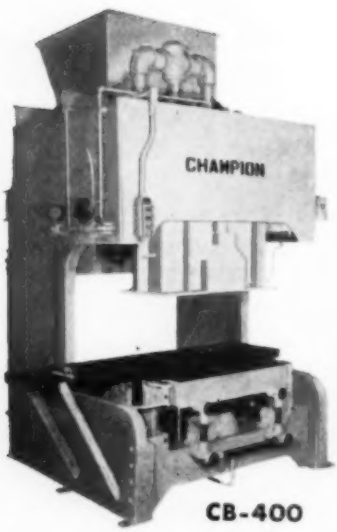
You can Blow 'em

How big did you say that core is? Never mind, there's a Champion Core Blower to handle it. Look at the line-up below, beginning with the daddy of them all, the CB-400, on down to "Junior", the CB-5, and whatever your requirements, one or more of these machines will fill those core boxes, and FAST! It takes no longer to blow 250 pounds of sand into a large core box on the CB-400, than to blow a gang of 2-ounce cores on the smallest model.

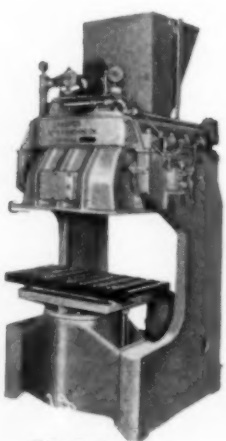
Try it yourself, and see!



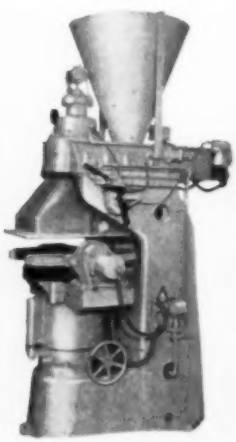
CB-5



CB-400

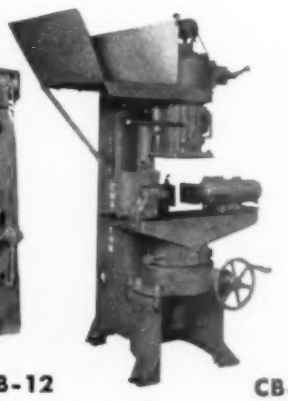


CB-18



CB-15

CB-12



CB-10

Small-

Some of the many cores needed in producing castings for Evinrude outboard motors. Made on Champion core blowers in the Liberty Division Foundry, Grede Foundries, Inc., Milwaukee, Wisconsin.

all ON CHAMPIONS!

Every Champion core blower, from the largest to the smallest, possesses every feature that gives every Champion its outstanding speed, safety and precision. Operators using Champion Core Blowers find their work easy to learn and pleasant to perform. All effort is supplied by the machine, the operator merely directs and controls it. Hence there is no fatigue to slow down production toward the end of the day.

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SALES OFFICE: 1553 W. MADISON ST., CHICAGO 7, ILL.

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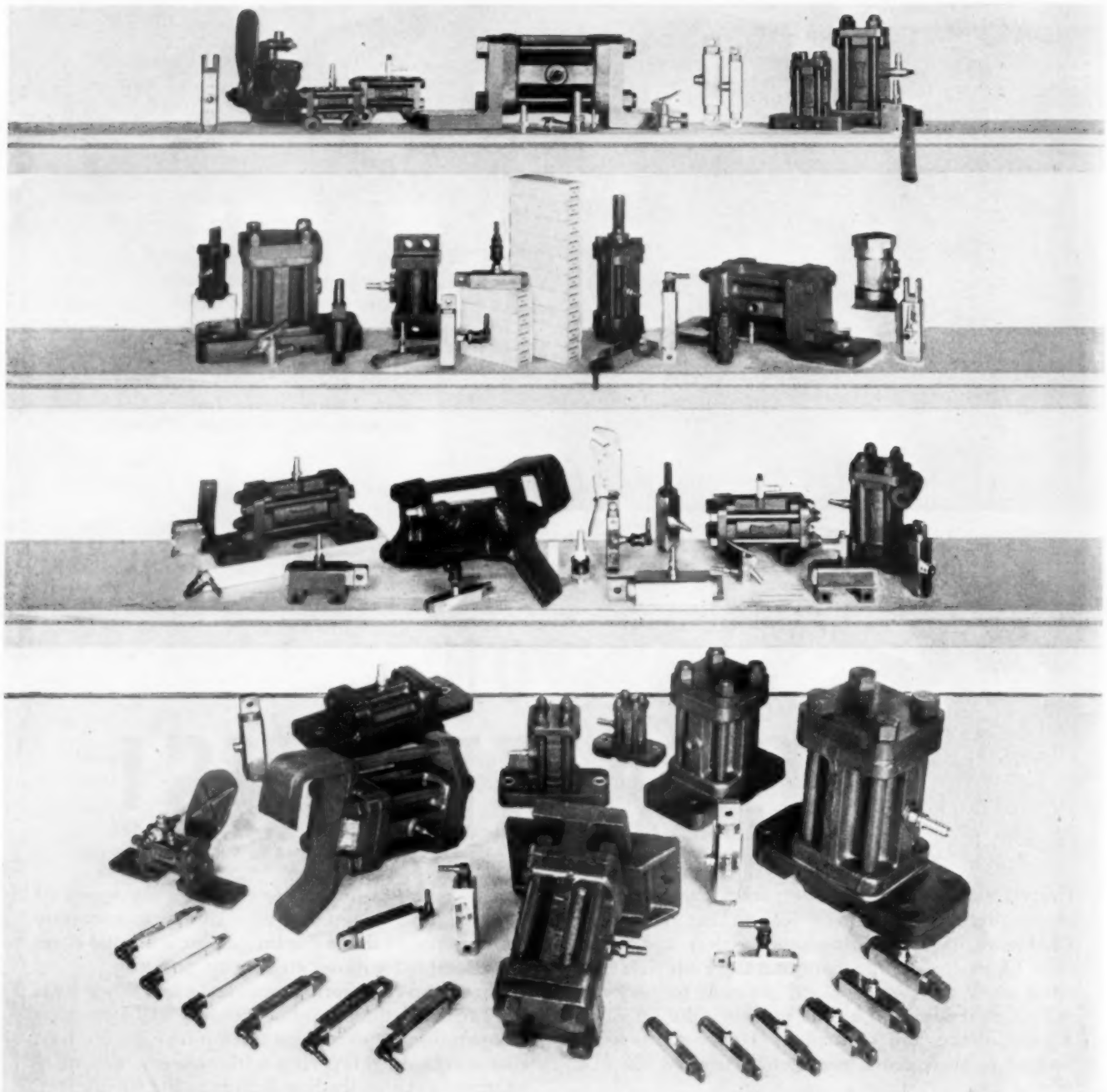

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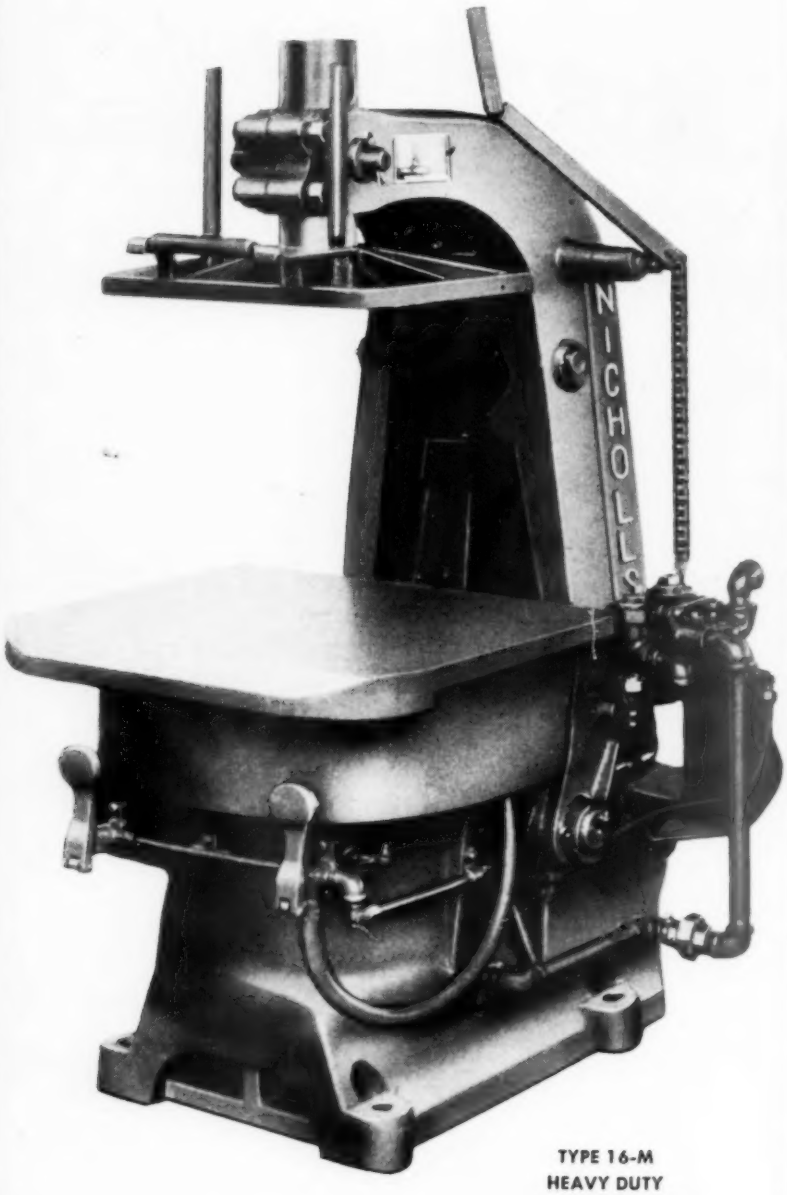
This machine is provided with an interlocking means which insures the head being in squeezing position before the squeeze valve can be operated. The squeeze head is operated to and from the squeezing position with ease.

The base and squeeze cylinder is a heavy, one-piece semi-steel casting. All pins and bushings are case hardened and ground to size. This machine requires a minimum of floor space.

Descriptive leaflets, giving specifications and dimensions of this, and many other Jolt-Squeeze and Pattern Draw machines, sent upon request.



TYPE 16-M
HEAVY DUTY
JOLT-SQUEEZER

Wm. H. NICHOLLS Co., Inc.

RICHMOND HILL 18, LONG ISLAND, NEW YORK

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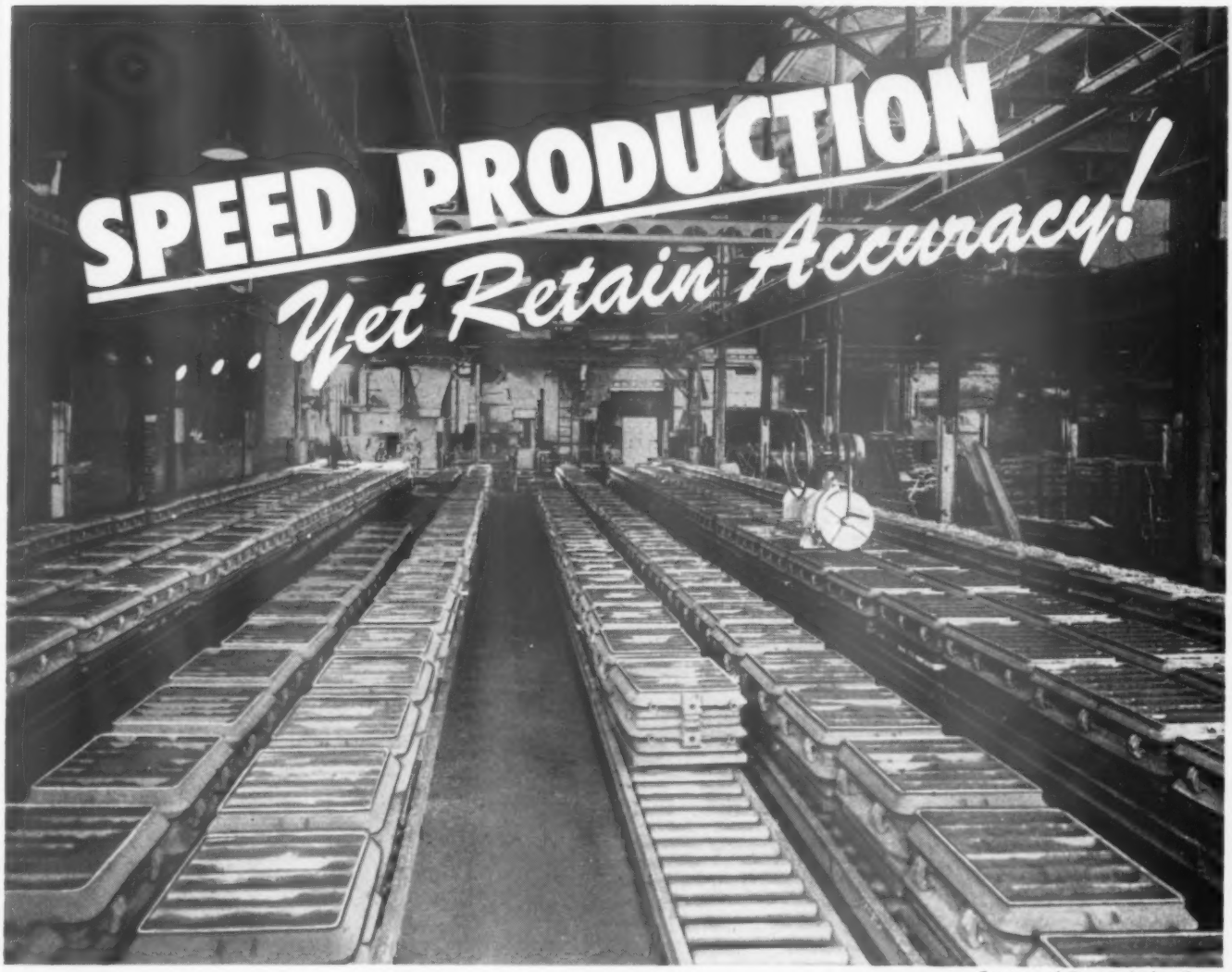


Courtesy of Detroit Stoker Co.

Row after Row of Steel Flasks in this Modern Foundry . . . and they're ALL Sterling Flasks!

You can operate your production foundry at top efficiency if you standardize on Sterling Steel Flasks. Sterlings combine maximum strength with minimum weight . . . strength to withstand hard usage . . . lightness for ease and speed of handling. Solidly constructed of all-welded, rolled steel channel, with angle reinforcing, square flanges and full-width bearing, Sterlings are available in a variety of styles and shapes to meet your individual needs. Write today for your copy of Sterling Catalog No. 59.

STERLING WHEELBARROW COMPANY

MILWAUKEE 14, WISCONSIN, U. S. A.

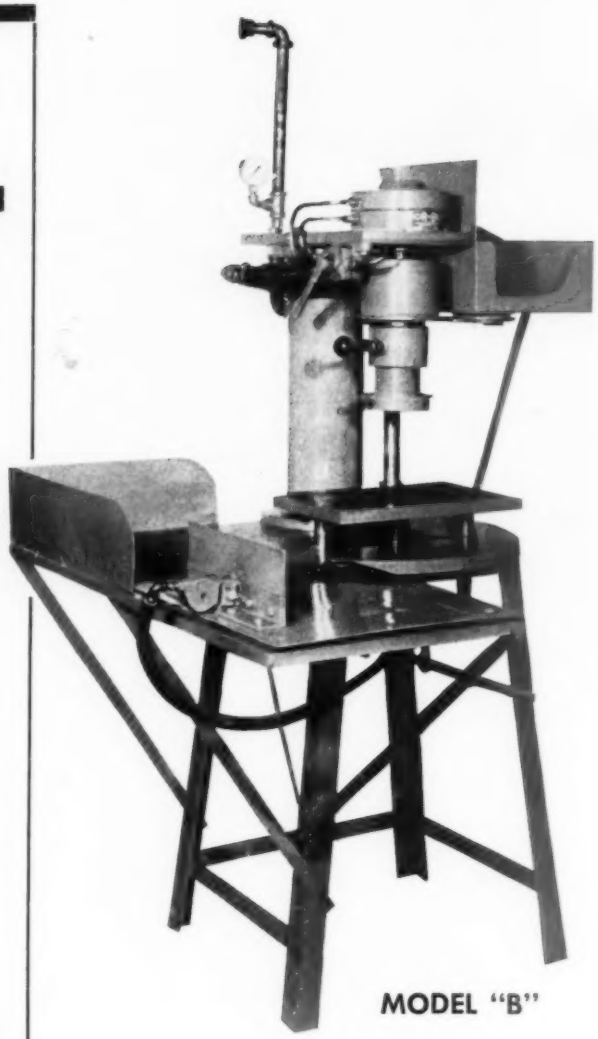
Sterling Style "LLT" Steel Flask with single pin lugs, cast steel trunnions and tubular steel handles welded to each section.

A 5535-1P-C

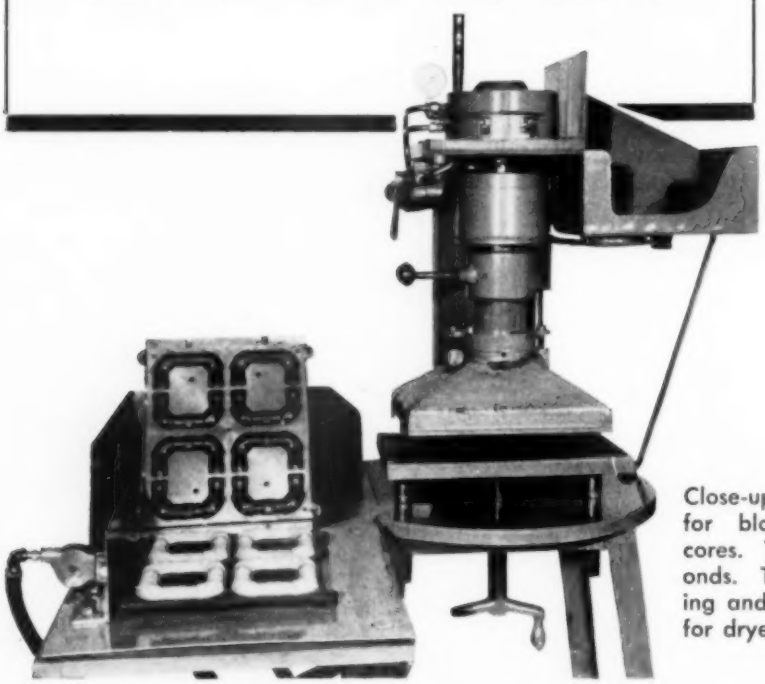
THIS IS THE
▪ cOR-BLo ▪
MODEL "B"

Patents and Trade Mark Applied For

This economical, low-priced, hand-operated machine will quickly pay for itself. It is sturdily built of the best materials to guarantee long life, and correct design assures ease of operation and simple renewal of wearing parts. Other features include: Quick and easy changeover for short run jobs; hardened stainless steel valves; time and labor saving vibrator table which lengthens life of the core box; operation by knee-lever to leave both hands free; can be equipped with various sized sand carriers and air operated vise.



MODEL "B"



Close-up view shows application for blowing sixteen ¾" elbow cores. The blowing cycle is 15 seconds. This view also shows vibrating and drawing table with space for dryers.

MACHINES AVAILABLE

MODEL "B"—Hand Operated
MODEL "C"—Automatic
MODEL "D"—Duplex Automatic

Write for Circular

HARRISON MACHINE CO.

Designers and Builders of Machinery

P. O. Box 67 **Wesleyville, Pa.**

MILWAUKEE MOTOR CHAPLETS

With the Famous MILWAUKEE Thread Stem

No, you don't have to specialize in motor blocks or heads in order to profit through the use of these small but effective chaplets. While they were primarily developed to facilitate the production of "motor castings" they have proved equally valuable in thousands of "light section" applications.

Today, they are used in hundreds of well-known foundries whenever light sections are poured . . . and especially where the finished castings are to be subjected to gas, steam, oil or water pressure. Experienced foundrymen say "you can't beat 'em" for the double benefit of a well secured core and a pressure-tight casting. They eliminate practically all scrap loss due to "leakers."

Thread Stem Chaplets at NO EXTRA COST!

These light double head chaplets have the famous MILWAUKEE "Thread Stem," which permits the use of a heavier stem for greater strength without sacrificing fusibility. They are available with plain or perforated, round or square heads, in stem diameters of 3/64" to 3/16", with plain, coppered, or tinned finishes. For the non-ferrous foundries they can be supplied in pure aluminum. They cost no more than plain or "deformed" stem chaplets. Write for samples.

MILWAUKEE CHAPLET & MFG. CO.
1025 SOUTH 40TH STREET • MILWAUKEE 4, WISCONSIN

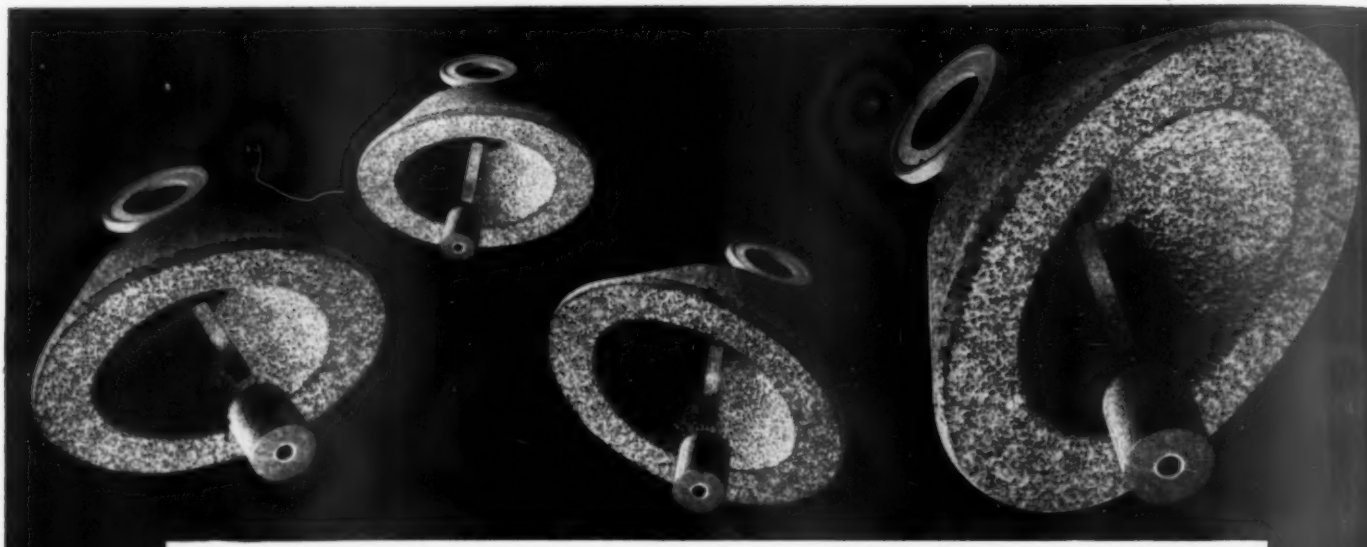
Other MILWAUKEE Products . . .

Standard Double Head Chaplets, Forged Stem Chaplets, Fitted-Head Stem Chaplets . . . all with the Famous MILWAUKEE Thread Stem; Angle Chaplets, Schmitz Chaplets, Adjustable Radius Chills*, Standard Radius Chills, Mold Anchors* . . . and the MILWAUKEE-TESSMER Sprue Cutter for non-ferrous foundries.

*PATENTED

MILWAUKEE CHAPLET

A5568-IP-C



Now! Peninsular announces custom-tailored vitrified wheels!

Peninsular announces the addition of vitrified bonded wheels to its present line of superior resinoid bonded wheels.

These vitrified wheels offer the same custom-tailored precision as the Peninsular resinoid line. They are available in a variety of sizes and shapes to meet most of your grinding needs. Continued expansion and development of the vitrified line will assure individualized engineering attention for many of your grinding operations.

This news may be the best of the year if you're glum because of high grinding expenses. Peninsular's new vitrified wheels and "tailored-for-the-job" service may be able to help you cut down dressing costs, give you longer wheel life and higher stock removal. *Why not call on Peninsular engineers to plot a new grinding course for you?*

They'll examine everything about your grinding operations—the machinery used, the materials ground, and the finishes required. After a complete study of their findings, Peninsular develops and recommends wheels specifically designed to fill your needs.

Peninsular has brought the good news of lower grinding costs to manufacturers in over fifty diversified fields.

Why not get good grinding news for yourself this year by calling on our Peninsular consultants?

The Peninsular Grinding Wheel Co., 729 Meldrum Ave., Detroit 7. Sales Offices: Chicago, Philadelphia, Buffalo, Cleveland, Pittsburgh, Houston, St. Louis, Cincinnati.

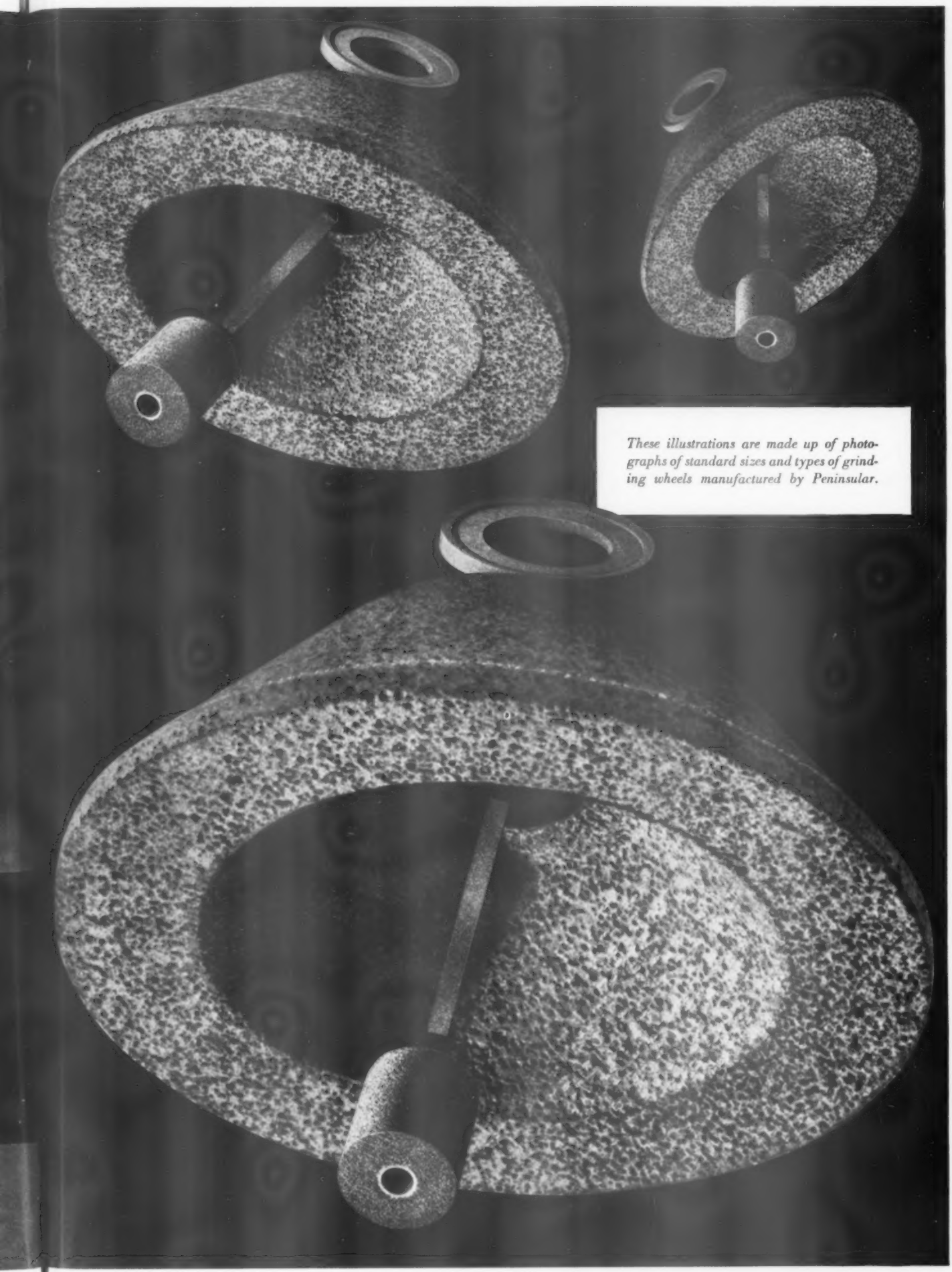
PENINSULAR

INDIVIDUALLY PENINSULAR *ENGINEERED*

GRINDING WHEELS

SINCE 1889

SPECIALISTS IN RESINOID AND VITRIFIED BONDED WHEELS



These illustrations are made up of photographs of standard sizes and types of grinding wheels manufactured by Peninsular.

Eliminate ASH AND FREE CARBON

with....

DELTA PERMI-BOND*

THE MODERN, SCIENTIFIC SEACOAL REPLACEMENT

DELTA PERMI-BOND is a specially prepared pure hydrocarbon, completely volatile at elevated temperatures. It decomposes to form a vapor-gas cushion, which is reducing in nature, and leaves only a trace (two tenths of 1% maximum) of ash.

Do not confuse DELTA PERMI-BOND with other sand additives or so-called "chemical sand-coating" cure-alls which may consist mainly of asphalt, or other petroleum by-product pitches dissolved in fuel oil or other solvents. DELTA PERMI-BOND is a scientific development protected by United States patents allowed.

*Licensed for foundry use under U. S. Patent 2256832.

NINE IMPORTANT ADVANTAGES

1. Always uniform. Manufactured under rigid chemical and physical control.
2. Eliminates ash and free carbon which contaminate your sand.
3. Greatly reduces gas, smoke, soot and dirt in the foundry.
4. Provides correct amount of vapor gas in the mold cavity which allows use of lower permeability sand without casting blows.
5. Increases dry strength properties of sand.
6. Prevents scabbing, buckling, rat-tailing and cutting, greatly reducing scrap castings.
7. Improves casting finish . . . cuts cleaning room costs to a minimum.
8. More economical to use: cuts sand costs.
9. Much cleaner, more foolproof than seacoal.

DELTA OIL PRODUCTS CO.

MILWAUKEE 9, WISCONSIN

★ This British foundry has followed a progressive policy by (1) keeping its facilities up to date; (2) modernizing as production demands increase; (3) maintaining efficient machinery.

It is a good place to work—

An overhead chain conveyor delivers cores to coring up section of the plant. Automatic shakeout equipment is used. A modern sand preparation system, including distribution belts and overhead hoppers, is employed. Roller conveyor delivers dried cores to inspection, and is used extensively throughout the foundry in handling molds, flasks, castings, etc. Particular attention is paid to good lighting.

A battery of Herman machines, produced by Pneulec Limited, are used in this foundry. The 1500-pound capacity jarr rollover machine illustrated is a good example. This machine is ideal for fast production of accurate work. It is characteristic of *all* Herman machines, because of its rugged design; simplicity of operation; pressure lubrication to each moving part; fast, smooth hydraulic rollover and pattern draw.

More details on any Herman machine will be gladly supplied, to prove that they've made their way by the way they're made.

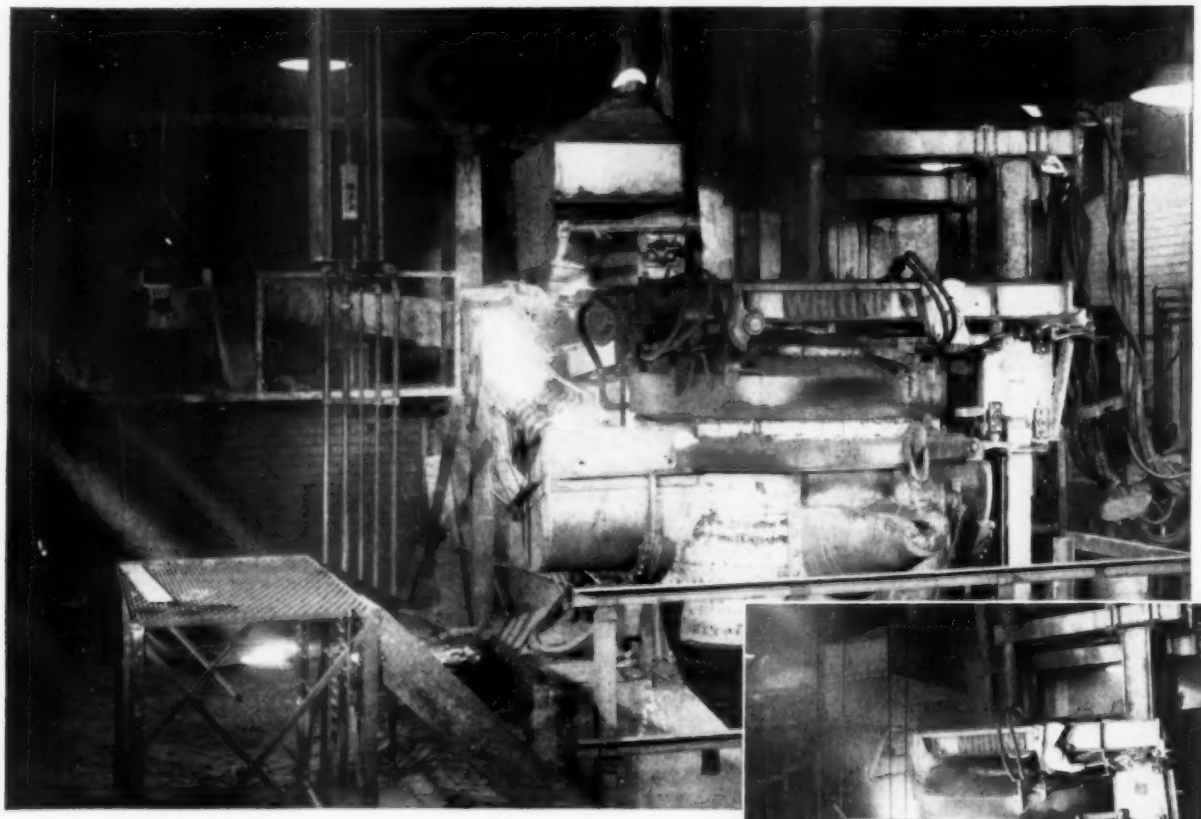
Herman **MOLDING MACHINES**

HERMAN PNEUMATIC MACHINE CO., UNION BANK BUILDING, PITTSBURGH, PA.

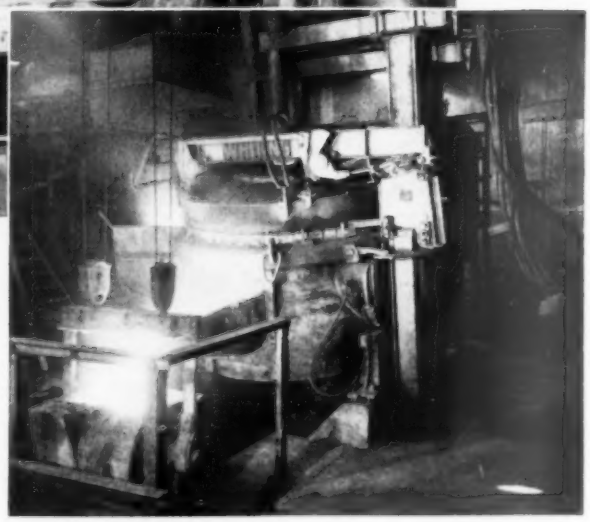
Cupola to Electric

MELTING WITH NEW CONVENIENCE

BETTER CASTINGS



Whiting Electric Furnace used for holding cupola metal. Note hot metal flowing continuously from the Whiting Cupola to the Whiting Hydro-Arc Furnace.



The same furnace with power on, pouring metallurgically adjusted, superheated metal into a ladle.

Whiting Hydro-Arc Furnaces have established new standards of convenience and economy in electric melting and heating. Floor-operated electrode clamps save workmen having to climb over the furnace to serve out electrodes that stay tight. Counter-balanced hydraulic electrode positioning equipment provides the kind of regulation required in this operation.

In some foundries, as in this one, Hydro-Arc Furnaces are used as holding furnaces to increase the temperature of cupola metal and provide facilities for metallurgical adjustments. Whiting engineers will gladly discuss with you this and many other foundry uses for Hydro-Arc Furnaces.

WHITING
CORPORATION

15607 Lathrop Ave., Harvey, Illinois

Offices in Chicago, Cincinnati, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, and St. Louis. Agents in other principal cities. Canadian Subsidiary: Whiting Corporation (Canada) Ltd., Toronto, Ontario. Export Department: 30 Church St., New York 7, N. Y.

AIRCOLITE — AIRCO SELF HARDENING — AIRCO TUNGTUBE — AIRCO TUNGSERTS — AIRCOLOY NOS. 1 & 6 — AIRCO NOS. 388, 91, 82, 53, 46 AND NICKEL MANGANESE

Special Offer

AIRCO'S NEW HARDFACING ALLOYS

...a trial assortment for only $2.95

Your name on the coupon below will bring you — *at a special introductory price of only $2.95* — a trial assortment of Airco's NEW line of Hardfacing Alloys.

You will receive:

1. The NEW Aircolite Hardfacing Alloy (for oxyacetylene and electric application) — especially recommended for pulverizer hammer, coke crusher rolls, and so on, subjected to *severe abrasion and medium impact.*
2. The NEW Airco Electric Self Hardening Alloy — for bucket teeth, sizing screens and similar equipment subjected to *severe impact and abrasion.*
3. Instructions for these two alloys, plus a booklet describing Airco's line of Hardfacing Alloys.

. . . and of vital importance to you — you will receive enough of these rods to see for yourself how the NEW Airco Hardfacing Alloys extend the service life and improve the operating efficiency of your equipment.

Since this special price is good for a limited time only, we suggest that you fill in and mail the coupon below — NOW! Send it to our nearest office or authorized dealer. On West Coast: Air Reduction Pacific Company. Represented Internationally by Airco Corporation (International).

Mail this coupon today for your special assortment of the New Airco Hardfacing Alloys ▶

F

Air Reduction
60 East 42nd Street, New York 17, N. Y.

☐ Here is my check for $2.95 — send me the special package of Airco's Hardfacing Alloys.

☐ Send me your booklet: "Airco Hardfacing Alloys" — at NO cost to me.

Firm_____

Signed By_____

Address_____

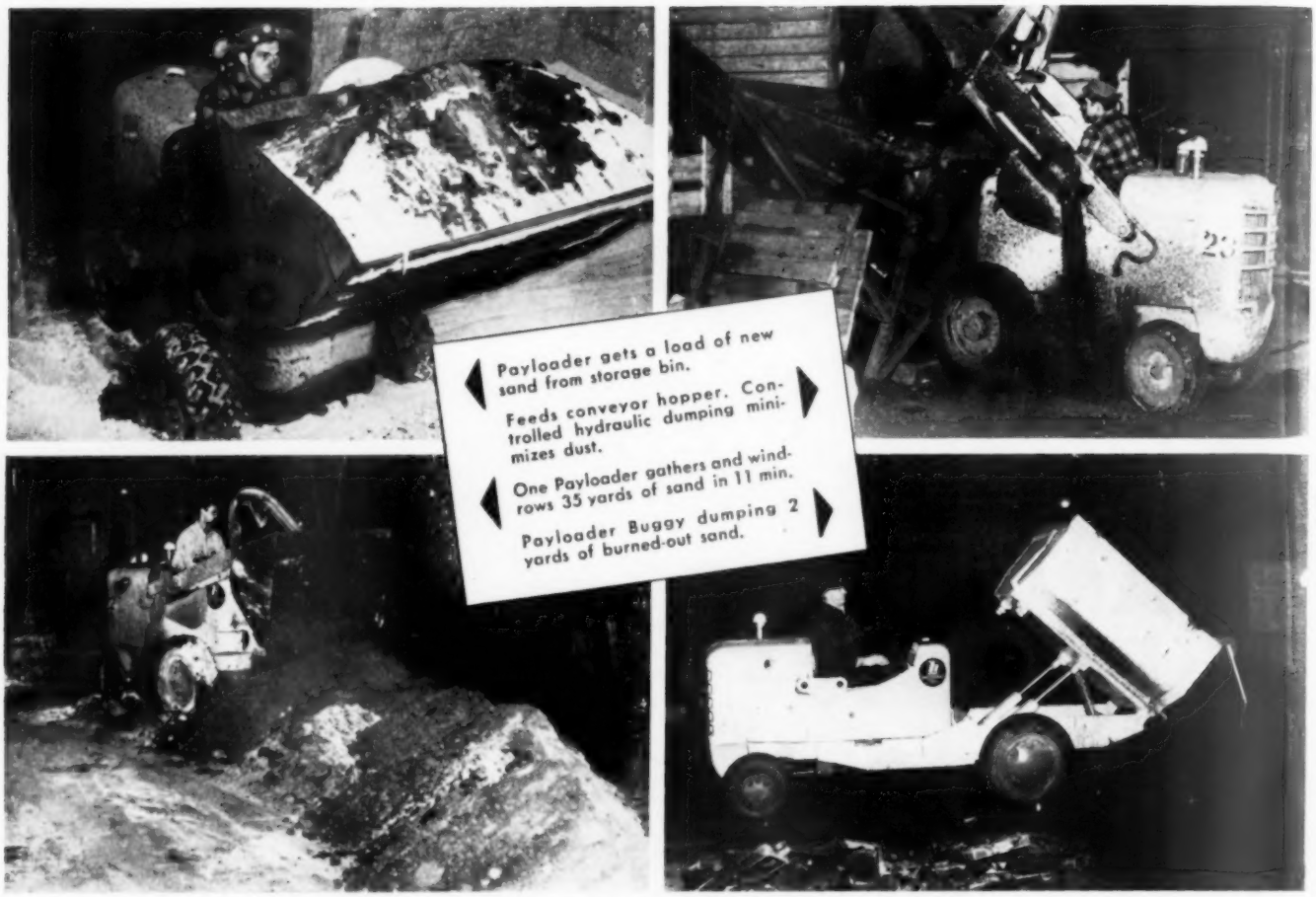
City & State_____

AIRCO

AIR REDUCTION

Offices in All Principal Cities

Headquarters for Oxygen, Acetylene and Other Gases...Carbide...Gas Welding and Cutting Machines, Apparatus and Supplies... Arc Welders, Electrodes and Accessories


Payloader gets a load of new sand from storage bin.
Feeds conveyor hopper. Controlled hydraulic dumping minimizes dust.
One Payloader gathers and windrows 35 yards of sand in 11 min.
Payloader Buggy dumping 2 yards of burned-out sand.

Solved-A Tough Bulk Handling Problem

Six PAYLOADERS and one BUGGY Provide Fast, Flexible Handling System for Chicago Hardware Foundry Co.

PROBLEM: To store and distribute all types of bulk materials — to feed them into the production system without delays — to remove waste materials immediately from the production area — to recondition salvable materials — to lower production costs — to reduce foundry dust — to increase output per manhour — to increase safety.

1. Sand, new and reconditioned, must be brought to molders on schedule.
2. Slag must be removed promptly from furnace area.
3. Scrap cores must be quickly removed from the used sand.
4. Sprues must be promptly returned to cupolas.
5. Production interruptions due to unavoidable emergencies must be prevented.

SOLUTION: Six Model HA Payloaders and a Payloader Buggy, working an 18-19 hour day, handle sand, coke, slag, cores, sprues and bond. Each does the work of a crew of men. Together they have effected substantial savings, increased efficiency and increased production.

Tremendous production economies have resulted because Payloaders (1) supply a steady flow of new sand to production, (2) speedily shift many tons of used sand to the "shakeout," reducing manual shovel work to a minimum, (3) spread and windrow sand for reconditioning, (4) transport it to molding department and dump into hopper.

The Payloader Buggy hauls (1) sprues, an average of 325 ft. back to the cupolas, (2) broken cores to a pit 550 ft. distant, (3) burned-out sand to another pit equally distant.

Payloaders provide a complete, fast, flexible bulk material handling system for large or small foundries. There are sizes to meet your exact needs and conditions. Write for complete details today. The Frank G. Hough Co., 703 Sunnyside Avenue, Libertyville, Illinois.

SEND **for Job Study No. 10 . . .**
A complete analysis of this foundry's modern materials handling system.

SAY "HUFF"

HOUGH
PAYLOADER
Manufactured by THE FRANK G. HOUGH CO.

Any way you shake 'em

ROTO-CLONE REMOVES THE DUST

TWO methods of shakeout are employed in this foundry but only one method of dust control—Roto-Clone*.

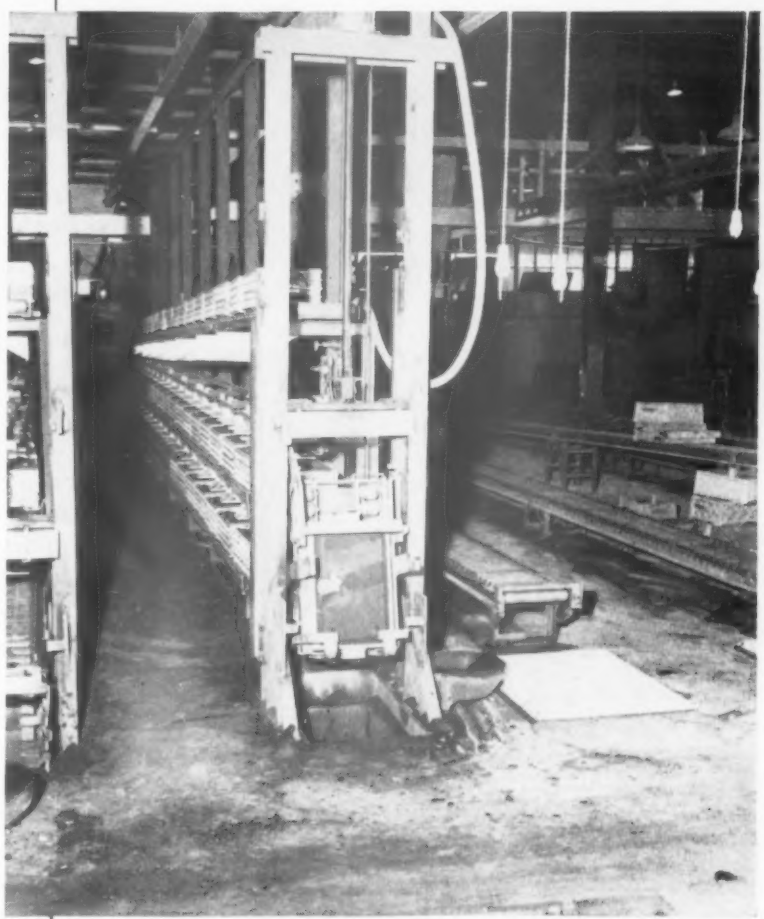
At left you see one of several conveyor lines which deliver flasks to floor grate dumps. Sand and castings are emptied automatically onto a conveyor below and removed to a central shakeout.

Here again Roto-Clone demonstrates both its all around efficiency and flexibility. A Type W unit (Arrangement A) performs an important three-way job. It provides the necessary down draft through the floor opening, ventilates the enclosed conveyor tunnel and collects dust from both the tunnel and shakeout.

On another line in the same foundry, conventional flask shakeout is employed. Pictured above is a Link Belt 3x5 Shakeout from which dust is removed by the side hood exhaust of a Type W Roto-Clone (Arrangement C).

An ever-growing number of foundries are standardizing on Roto-Clones. You'll find the answer in a complete line of equipment designed to solve practically every major dust problem in the simplest, most effective manner. Write for complete information or call your local AAF representative.

AMERICAN AIR FILTER COMPANY, INC.
266 Central Avenue, Louisville 8, Ky.
In Canada: Darling Bros., Ltd., Montreal, P. Q.



Automatic floor grate dump shakeout controlled by AAF Type W Roto-Clone.

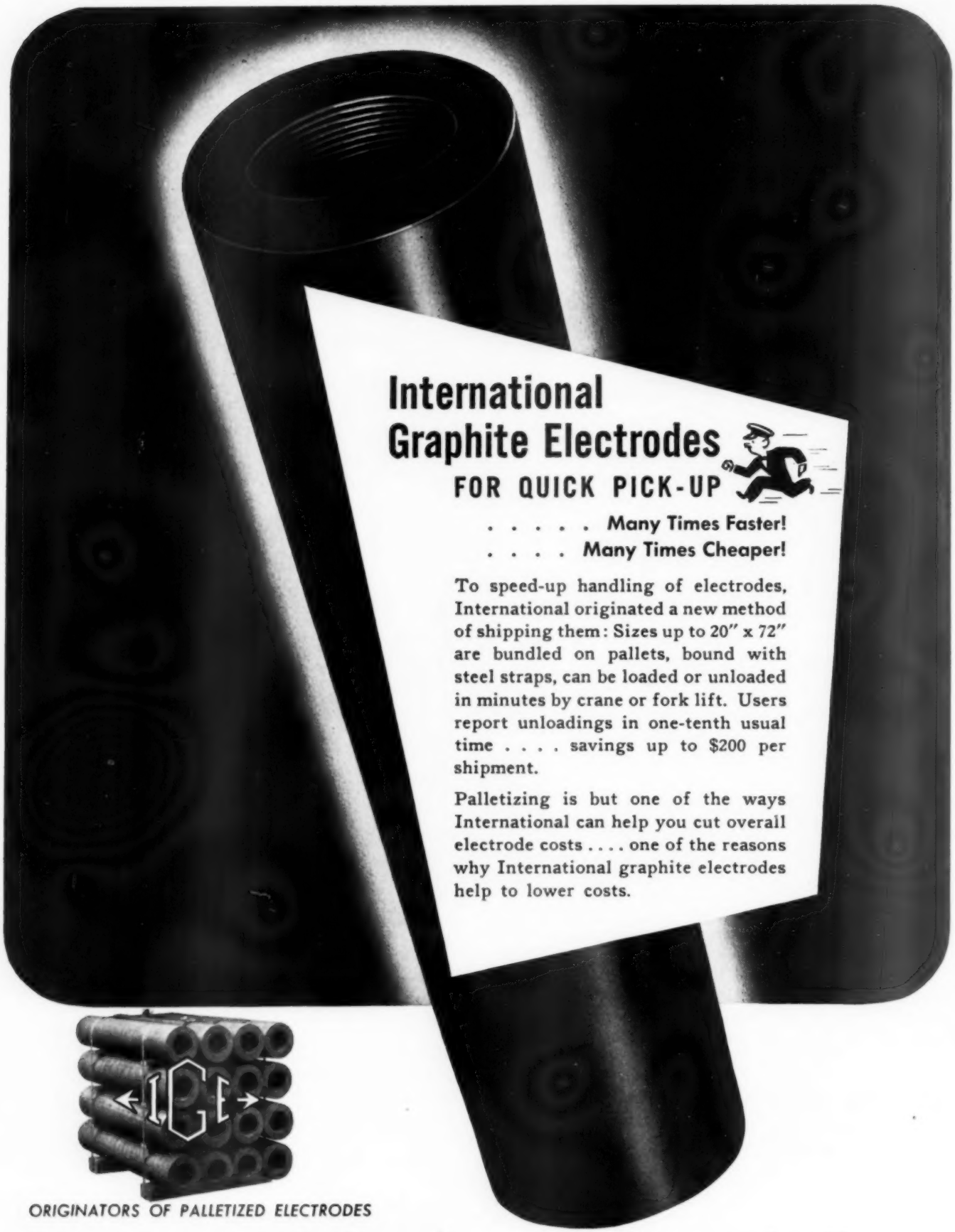
Bulletin No. 274-A—gives the complete story about Type W Roto-Clone design and operation. It's free—write for a copy now!

**Roto-Clone is the trade-mark (Reg. U. S. Pat. Off.) of the American Air Filter Company, Inc., for various dust collectors of the dynamic precipitator and hydro-static precipitator types.*

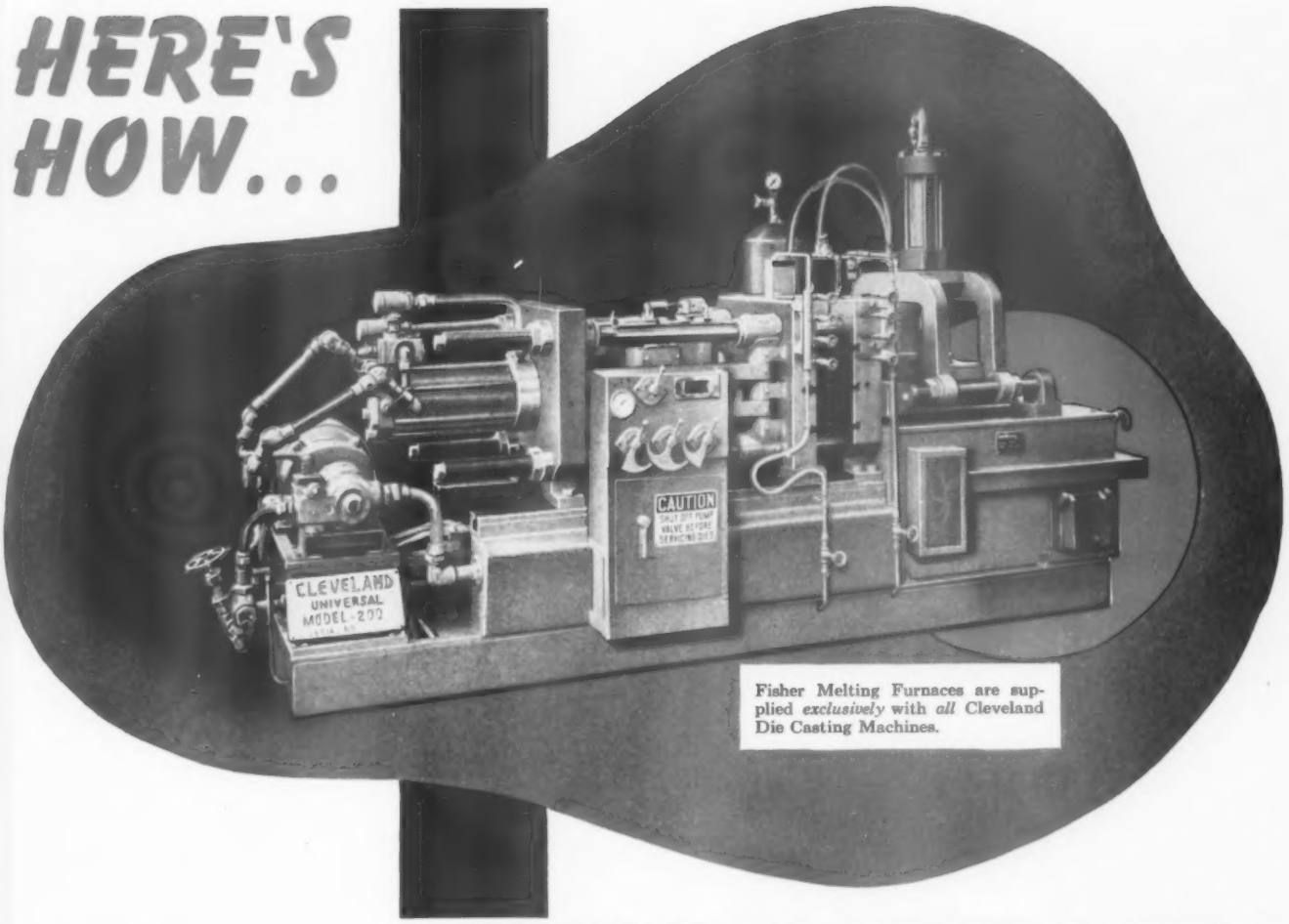
AAF

MEMBER AIR FILTRATION EQUIPMENT

ROTO-CLONE®
DUST CONTROL EQUIPMENT


International
Graphite Electrodes
FOR QUICK PICK-UP
. . . . . Many Times Faster!
. . . . Many Times Cheaper!
To speed-up handling of electrodes, International originated a new method of shipping them: Sizes up to 20" x 72" are bundled on pallets, bound with steel straps, can be loaded or unloaded in minutes by crane or fork lift. Users report unloadings in one-tenth usual time . . . . savings up to $200 per shipment.
Palletizing is but one of the ways International can help you cut overall electrode costs . . . . one of the reasons why International graphite electrodes help to lower costs.
I.G.E.
ORIGINATORS OF PALLETIZED ELECTRODES
International Graphite & Electrode Corp.
4697
ST. MARYS, PA.

HERE'S HOW...



Fisher Melting Furnaces are supplied *exclusively* with *all* Cleveland Die Casting Machines.

...CLEVELAND DIE CASTING MACHINES

MELT METAL

Fisher Melting Furnaces are supplied *exclusively* with *all* die casting machines manufactured by Cleveland Automatic Machine Company. Fisher Melting Furnaces are *built-in* as an integral part of all Cleveland Automatic *zinc* die casting machines.

John Prohaska, Vice President and Sales Manager of Cleveland Automatic Machine Company says: "We find it a distinct advantage to be able to supply our die casting machine customers with *any* type of melting furnace. It is important to our customers and ourselves that we can ship Cleveland Die Casting Machines as complete packaged units."

For detailed information on Fisher Furnaces write your nearest Fisher or Lindberg office.

HERE'S WHY...

★ **Fisher builds every type of melting furnace**—oil, gas, electric or electric induction for melting aluminum, magnesium, zinc or brass. Thus Cleveland Automatic can supply with their die casting machines, the type of melting furnace best suited to their customer's individual requirements.

★ **The Fisher Service Department is nation-wide**—with Service Men permanently located in or near your city. Maintenance parts are easily and quickly secured.

★ **Fisher Furnaces are standard units**—not special furnaces. They are proven and trouble-free as a result of Fisher's 27 years experience in the manufacture of melting furnaces.

Fisher Furnaces

A DIVISION OF LINDBERG ENGINEERING CO.
2453 West Hubbard Street, Chicago 12, Illinois

Sure to suit your pressure needs

Gardner-Denver Class "RX" Single-Stage Horizontal Compressor—available in capacities from 89 to 1292 cubic feet displacement per minute.

Whether you need air at the usual shop pressures . . . or considerably below . . . there's a Gardner-Denver "RX" Compressor just right for your job. Available in a wide range of sizes, these compressors are famous for a variety of heavy-duty, full-load services. Volumetric efficiencies rate high — power costs unusually low. At the right are other reasons why you find the "RX" in so many different industries.

For complete information, write Gardner-Denver Company, Quincy, Illinois.

★ Complete water jacketing of cylinder, heads, and air passages assures low discharge temperature.

★ Suction valve unloaders on all inlet valves result in lowest power consumption during unloaded period.

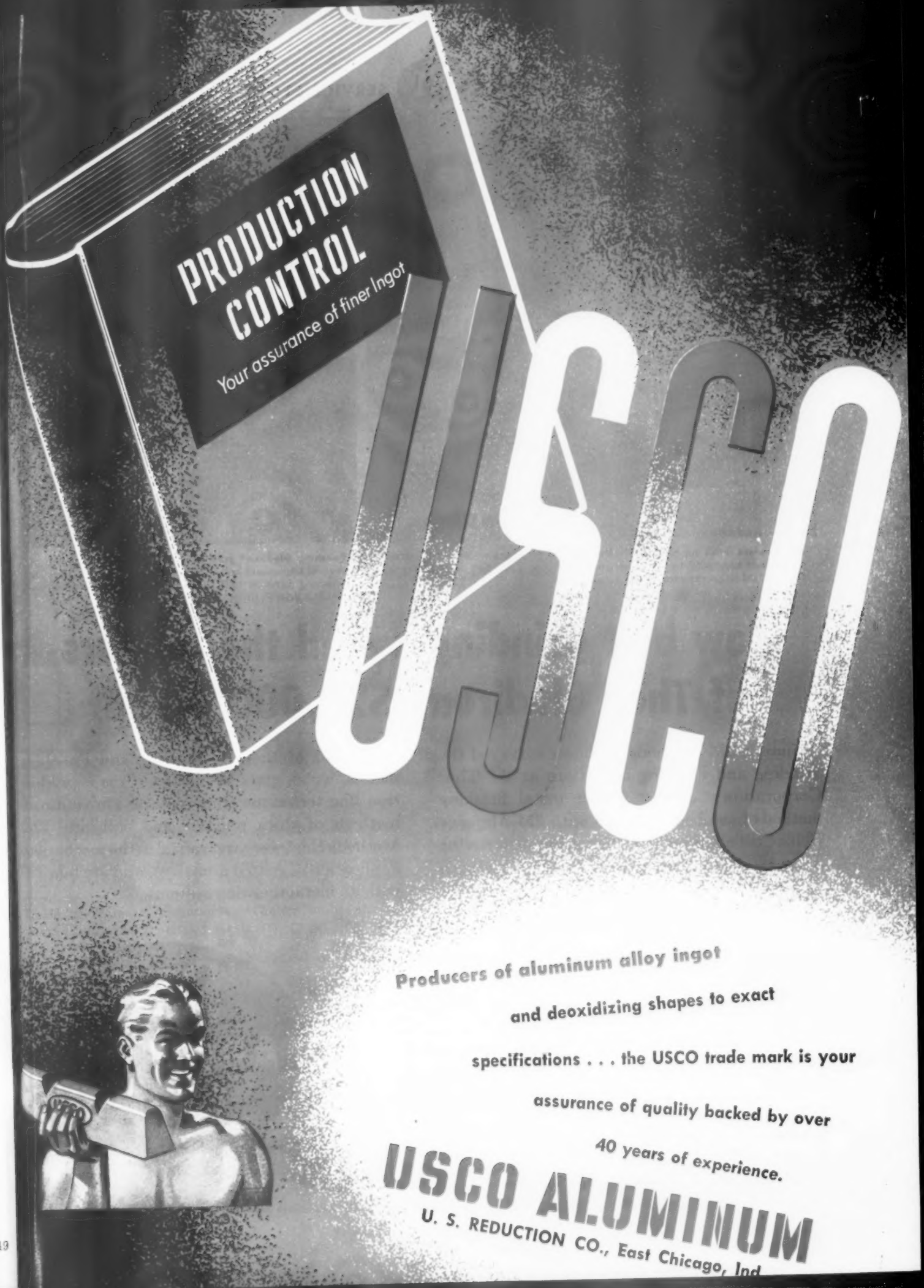
★ Gardner-Denver Duo-Plate "Cushioned" Valves—simple, durable, quiet.

★ Large, unrestricted port areas help reduce heat of compression; insure effective lubrication with minimum oil consumption.

★ Streamlined, enclosed main frame completely oil and dust tight—yet all working parts are easily accessible.

★ Timken adjustable double-row tapered roller bearings support crankshaft.

GARDNER-DENVER **SINCE 1859**


PRODUCTION CONTROL
Your assurance of finer Ingot
USCO
Producers of aluminum alloy ingot
and deoxidizing shapes to exact
specifications . . . the USCO trade mark is your
assurance of quality backed by over
40 years of experience.
USCO ALUMINUM
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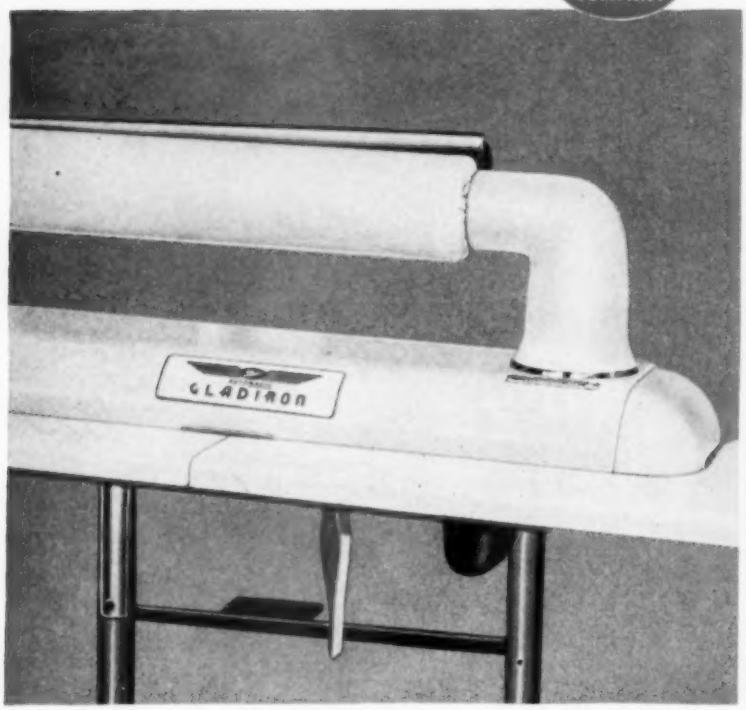
ANOTHER 3M COMPANY SERVICE STORY



The flawless finish on this Thor Gladiron* is obtained with belt grinding operations suggested by 3M Methods Engineers. This fast, efficient finishing method helps maintain a low retail price.

Polishing Gladiron* gray iron drive housings on one of several backstand belt grinders now in use by Thor cuts finishing time in half. This *one operation alone* saves $6000 a year in finishing costs.

How belt grinding saved the makers of Thor Gladirons* $20,000 a year

Since a 3M Methods Engineer surveyed the grinding and finishing operations at the Thor Corporation . . . many former metal finishing methods have been replaced with 3M Abrasive Belts. Cost analyses show belt grinding is saving Thor $20,000 annually, over previous methods of metal removal and polishing.

The 3M Method of Grinding and Finishing metals, wood, glass or plastics . . . is a production line technique that replaces conventional methods of stock removal and polishing. Our Methods Engineers are trained in the mechanical application of coated abrasives, and are familiar with all metal finishing systems.

*REG. U. S. PAT. OFF.

Made in U.S.A. by **MINNESOTA MINING & MFG. CO.**, *St. Paul 6, Minn.*

The attached coupon is your invitation for a 3M Methods Engineer to analyze your grinding or finishing operations. No obligation, of course.

Please send me a copy of your "Step Up Production" booklet.
Please send a 3M Methods Engineer to call on us. F-349

*Name*_____

*Firm*_____

*Title*_____

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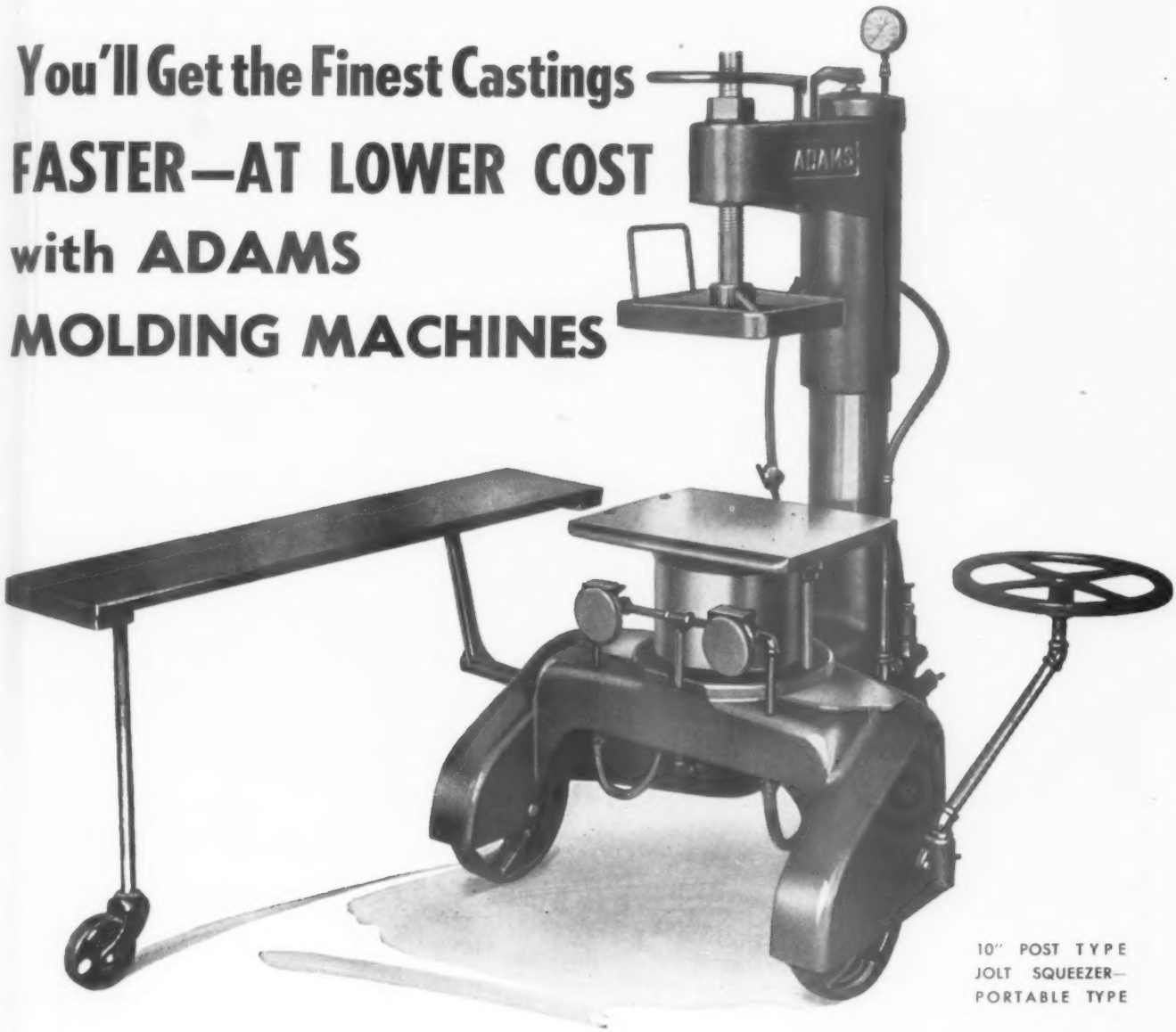
3M ABRASIVE BELTS

General Export: DUREX ABRASIVES CORP., *New Rochelle, N. Y.* • *In Canada:* CANADIAN DUREX ABRASIVES LTD., *Brantford, Ontario*

You'll Get the Finest Castings FASTER—AT LOWER COST with ADAMS MOLDING MACHINES



10" POST TYPE JOLT SQUEEZER—PORTABLE TYPE

Here's the fast, accurate molding machine that meets today's demand for high speed production of "exactly-true-to-pattern" castings . . . and reduces operating costs! Extremely flexible, Adams Molding Machines stand up under tough production schedules . . . substantially increase production of *better* molds in *less* time. Steady, high output levels are maintained even with unskilled labor.

Speed, stamina, power and simplified design make efficient operation easy. Convenient, accessible controls for quick handling . . . minimum working parts, protected against sand and dust, for reduced maintenance costs. . . . close control of jolting and squeezing operations for accurate, uniform molds. There's dependable, long-term service throughout prolonged hard usage in Adams Molding Machines. Write today for full details in Catalog 705. THE ADAMS COMPANY, 700 Foster Street, Dubuque, Iowa.

SIZES AND TYPES FOR ANY SQUEEZE MOLDING REQUIREMENTS

Side Rod Type and Post Type — Jolt Squeeze and Jolt-Squeeze-Pattern-Draw Styles — Stationary and Portable Hand Squeezers

The ADAMS Company

ESTABLISHED 1883

MOLDING MACHINES and FLASK EQUIPMENT

DUBUQUE, IOWA, U.S.A.

Cutting Foundry Grinding

Here's What Three Foundries Say About B-5 and B-7 Wheels—

- A malleable iron foundry reports, "We like Norton B-5 Resinoid Wheels because they cut fast and clean, and what's even more important, last an average of 30% longer than any wheels we've used previously."*
- A foundry producing steel castings says, "In a recent test a Norton wheel (A14-Q4B-5) gave us a cost per pound of material removed that was 32% lower than any wheel previously used."*
- A foundry producing Meehanite castings reports, "Norton B-7 Resinoid Wheels have helped us to hold down our foundry grinding costs even during a period when most production costs have skyrocketed!"*

*Further details and foundry name furnished on request.

Abrasives • Grinding Wheels • Grinding and Lapping Machines • Refractories • Porous Mediums • Norbide Products • Pulpstones • Non-Slip Floors • Labeling and Capsulating Machines

Costs for Over 3 Years!

These enthusiastic performance reports are typical of the many received from foundries throughout the country—foundries who have been cutting costs for three years with Norton B-5 and B-7 Resincid Wheels.

B-5 wheels are recommended for swing frame, floor stand and portable grinding jobs, where grinding pressures are light and excessive heat is not generated. B-7 wheels are used where the grinding pressure and consequent grinding heat is more severe.

Your Norton abrasive engineer or distributor will be glad to help you select wheels of the right specifications.

W-1228

NORTON ABRASIVES

NORTON COMPANY • WORCESTER 6, MASS. DISTRIBUTORS IN ALL PRINCIPAL CITIES

CASTFLUX

The "National" Dual Purpose Flux

An All Important and Proven Factor That Will Increase Operating Efficiency In The Face of Mounting High Labor and Material Costs!

"Hit and Miss" production is the sure road to loss.

More especially today when "sky-high" costs demand the most advanced and practical manufacturing procedure.

Castflux is a must in your foundry operations because it cuts losses, speeds up production.

CASTFLUX
Trade Mark Reg.

does this because it . . .

Degasifies iron in ladles.
Deoxidizes iron in ladles.
Increases fluidity by eliminating oxides, foreign material and gases.
Aids machinability by producing cleaner more closely grained castings.
Reduces amount of remelted metal from risers and rejects.
Keeps risers open longer and feeds more metal down to castings.
Helps keep ladles cleaner with longer life to lining.
Holds iron or steel molten and in condition longer when ladle pour must be held up for any reason.

And **Castflux** *does all this at a cost of only* **10¢** *to* **15¢** *per ton of metal treated*

NATIONAL

PIGMENT COMPANY
2115-2117 EAST YORK STREET
Philadelphia 25, Pa., U. S. A.

Bulletin on SUPER REFRACTORIES

by CARBORUNDUM
TRADE MARK

NO. 1 MARCH, 1949

Where Do Super Refractories Fit?

Super Refractories, as produced by CARBORUNDUM, are designed to augment the more commonly-used refractories. They fit in where the latter materials, for one reason or another, do not measure up to thermal, physical and/or chemical requirements.

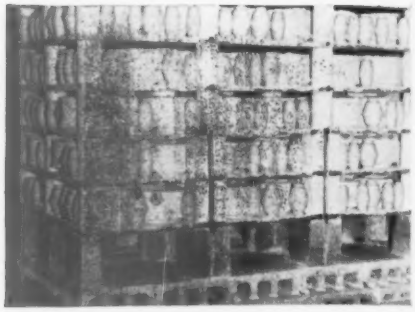
The characteristics of super refractories by CARBORUNDUM often make them the logical first choice in terms of cost of production or quality of work produced. High heat resistance is an outstanding property. These brick, tile and shapes stand up under temperatures that lead to the failure of other refractories. However, super refractories by CARBORUNDUM are often specified for other product properties... even at relatively low temperatures.

In effect, the line of super refractories by CARBORUNDUM are specialized products—custom-built—for specific requirements. They provide effective resistance to abrasion, spalling, chemical corrosion and thermal shock. They stand up under fast and frequent temperature changes.

The use of super refractories by CARBORUNDUM... either in complete structures or in localized trouble areas... results in longer refractory life, lower replacement cost, uniform production cycles, faster and less frequent cleaning and stepped up production. They give you lowest all-around refractory cost per product unit. Support for this fact is given in the installation data reported in this bulletin.

Physical Properties of Super Refractories by CARBORUNDUM
TRADE MARK

	CARBOFRAX	MULLFRAX	MULLFRAX S	ALFRAX K	ALFRAX B	ALFRAX BI
Heat Conductivity at 2200°F. in BTU/hr. sq. ft. and °F./in. of thickness	109 BTU	15 BTU	9 BTU	21 BTU	12 BTU	7 BTU
REFRACTORINESS PCE CONE	37-40	38-39	37-38	37-39	39-40	38
SPALLING RESISTANCE	High	High	High	Medium	Good	Good
ABRASION RESISTANCE	High	Medium	Medium	High	Medium	Low
THERMAL EXPANSION	Low	Medium	Medium	Medium	Medium	Medium
SPECIFIC HEAT	0.285			0.330		0.320
WEIGHT 9 IN. STRAIGHT	9.25 lbs.	9.5 lbs.	7.8 lbs.	10.1 lbs.	7.25 lbs.	4.5 lbs.



Switch to Super Refractories Increases Load "Fill" by Over 15%

Increased capacity plus considerable savings in time, money and trouble more than justify the change-over from saggers to open setting of super refractories in the case of this hotelware plant. Setters and posts support the ware load on kiln cars put through a direct fired continuous kiln on a 72 hour cycle. Operating temperature is 2300°F.

Since the switch to CARBOFRAX silicon carbide setters and MULLFRAX electric furnace mullite posts—output has increased, rejects and costs are lower. Extended service life and thermal shock resistance cut down the necessity of frequent car rebuilds... offer additional savings in both labor and material costs.

Super Refractories Withstand an 11 Year "Beating"

The super refractory brick installed in the fuel bed of this boiler furnace has been in continuous on-line service for more than a decade. CARBOFRAX silicon carbide brick has given this cost-cutting performance under conditions of flame erosion and mechanical abrasion as well as high temperatures. Its hard dense face resists clinker embedment and is unharmed by barring and cleaning. It possesses a high refractoriness as well. That is why it provides an excellent foundation for upper walls while preventing frequent outages in the hot punishment zone.

For these same reasons, CARBOFRAX brick and flue linings are preferred in water gas machine installations where their service provides more gas make at lower cost per MCF of gas produced.

"Carborundum," "Carbofrax," "Mullfrax," "Silfrax," "Alfrax" are registered trademarks which indicate manufacture by The Carborundum Company

Address all correspondence to: Dept. D-39, THE CARBORUNDUM COMPANY, Refractories Division, Perth Amboy, New Jersey

Continued on other side →

← Continued from other side

Super Refractory Slag Hole Blocks Assure Continuous Runs

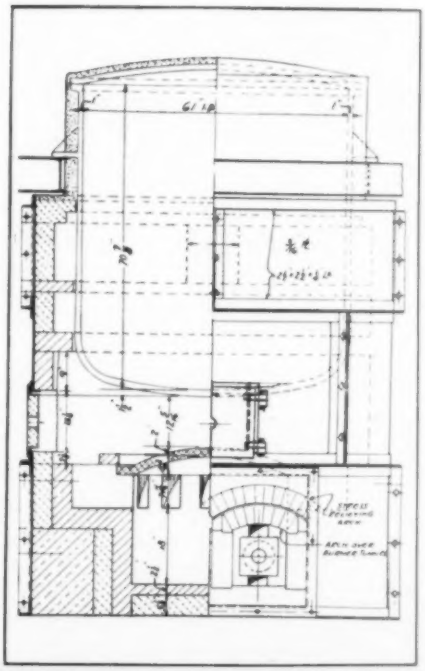
CARBOFRAX silicon carbide slag hole blocks are particularly resistant to slag erosion at high temperatures. A uniform hole size is maintained throughout continuous pour cupola runs—with no enlargement even when the blast is on. A constant slag stream is assured for twenty-four and even more hours. Costly shutdowns for replacement are avoided. Slag hole blocks are immediately available from stock in standard sizes. Special sizes are made to order.

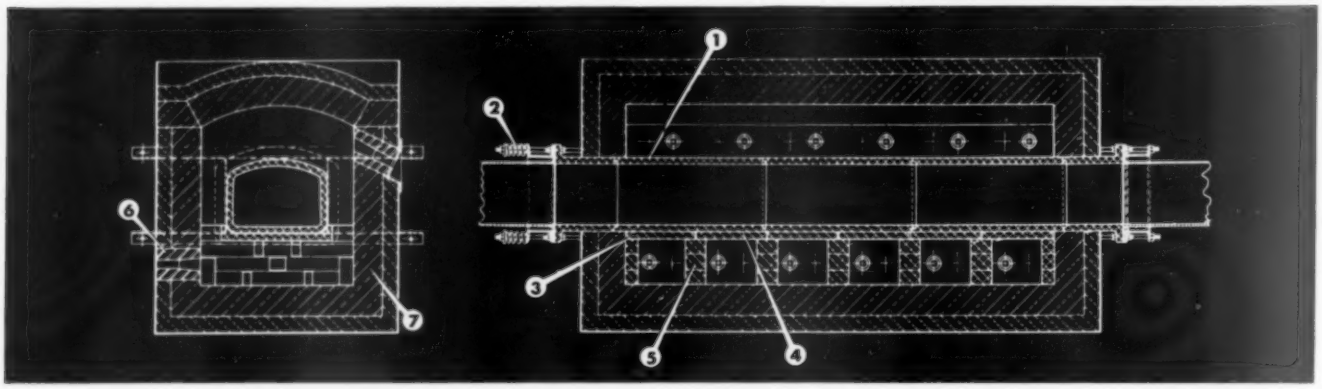
Unique Properties Provide Advantages in Low Temperature Applications →

Because super refractories are so closely identified with high temperatures, their advantages in the low temperature range are often overlooked. In this application, the charge is only heated to 350°C. Yet, because of a thermal conductivity 11 to 12 times that of fireclay, the CARBOFRAX silicon carbide arch radiates heat to the pot faster. Working temperature is attained with a reduced heat head.

Combustion chamber temperatures are lower. Because gases are at lower temperatures around the cast iron pot they are not as destructive. Life of both kettle and setting are extended with no repairs required after 5 years of service. Formerly, pots lasted about 6 months.

As a further aid to heat transfer, the CARBOFRAX arch may be half the thickness of fireclay—yet possess 3 to 4 times the mechanical strength. Strong resistance to cracking and spalling assures long, trouble-free service. This same advantage is realized in controllable offtake ports, lined with MULLFRAX S converted kyanite brick, which easily withstand temperature fluctuations.





Muffle Furnace Installation Exemplifies Versatility and Variety of Super Refractories

Several types of super refractories by CARBORUNDUM are used to advantage in this large muffle furnace with artificial atmosphere which employs sectional muffle with support plates and end compression.

1 The sectional CARBOFRAX muffle assures extended service with freedom from cracking and mechanical wear or frequent replacement. Exceptional refractoriness permits more continuous higher temperature operation without deterioration. At a lower initial cost, CARBOFRAX muffles approach the thermal conductivity of alloy steel at working temperatures. Furnace production is increased. Fuel cost remains about the same. Maintenance expenses drop.

2 Tight joints to prevent leakage of artificial atmosphere and permit muffle expansion and contraction are provided by spring compression.

3 CARBOFRAX support plates provide a continuous level bearing for the muffle. They are unaffected by high temperatures and resist cracking.

4 Various units are free to move independently on heating and cooling because of a special bedding cement developed to prevent sticking. This feature also simplifies any necessary replacements.

5 MULLFRAX or CARBOFRAX piers provide excellent support because they retain a high load-bearing strength at high temperatures. After extended service, there is no sagging or slumping.

6 Less attention is required for burner tunnels rammed with ALFRAX cement or formed with MULLFRAX S prefired blocks. Resisting flame erosion, spalling and cracking—they help maintain the hole size and thereby provide more efficient combustion conditions.

7 ALFRAX BI or MULLFRAX S linings withstand extreme high temperatures for extended periods without deformation. Heat is retained because of a low thermal conductivity. Worthwhile savings are realized. More continuous furnace operation is assured.

A complete file of informative literature covering super refractories is available through The Carborundum Company. There are facts and figures on installations in specific fields. To obtain copies of reports, booklets and catalogs of particular interest is a simple matter. Merely select from the list printed here. Copies will be sent you at once. No obligation, of course.

Super Refractories by CARBORUNDUM (general catalog)

Super Refractories for the Ceramic Industry

Super Refractories for the Process Industry

Super Refractories for Boiler Furnaces

Super Refractories for Heat Treatment Furnaces

Super Refractories for Gas Generators

The FRAX Line of SR Cements

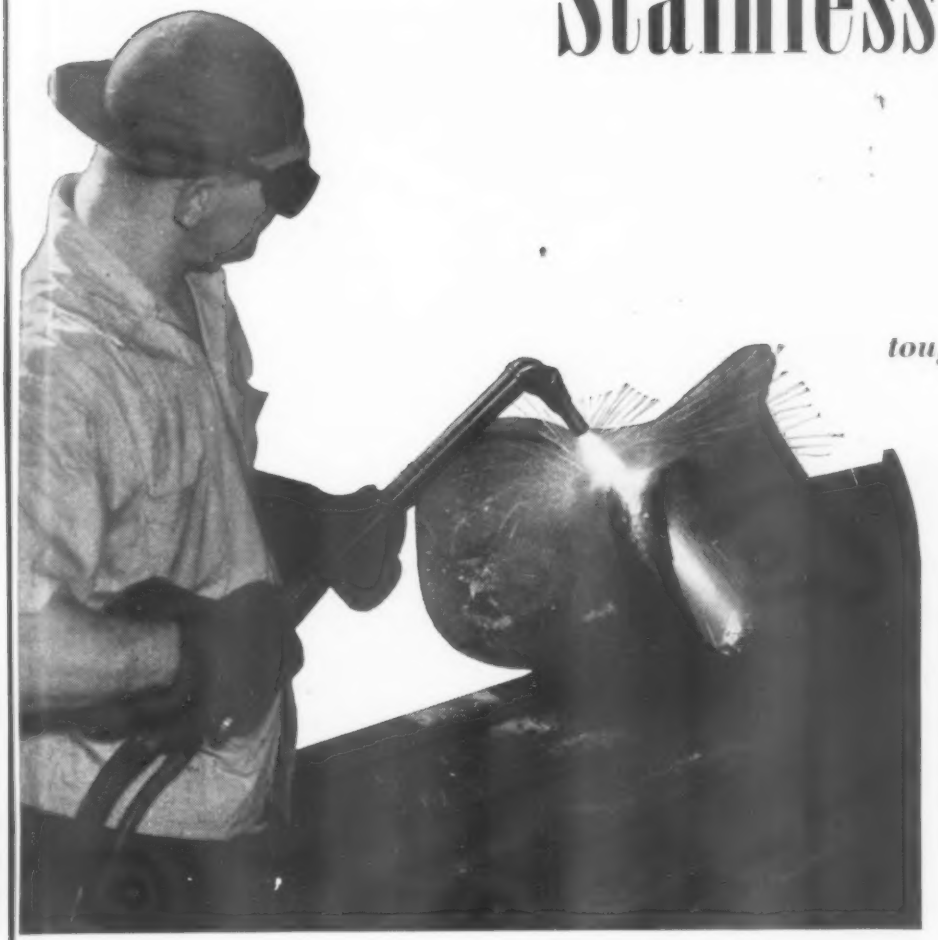
CARBOFRAX Refractories Skid Rails

Bulletins Nos. 1, 2, 3 on Underdrain Systems and Diffuser Media.

Dept. No. D-39

THE CARBORUNDUM COMPANY
Refractories Division
PERTH AMBOY, NEW JERSEY

Stainless Steel is TOUGH



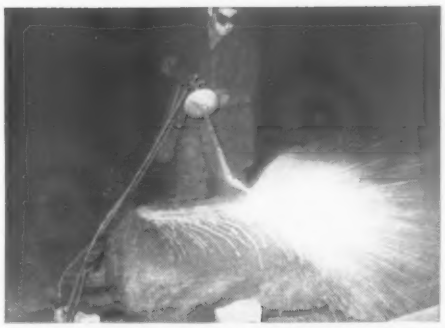
tough to cut, too—but LINDE makes the job easier . . . just as easy as cutting carbon steel

LINDE's powder-cutting process overcomes the barrier to fast and economical cutting of stainless or chromium steels.

By means of easily installed attachments for standard oxy-acetylene equipment, powder-cutting can be done without substantial change from carbon steel cutting techniques.

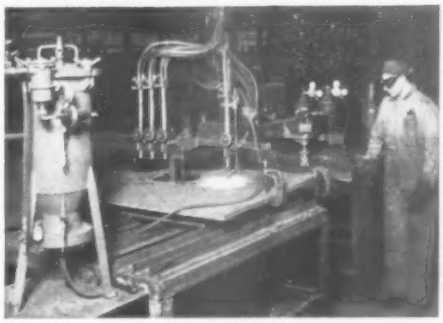
IN FOUNDRIES—

by powder-cutting, risers are removed 20 times faster than by older methods. Removal of riser pads and gouging out defects can be done at considerable savings in cost.



IN STEEL MILLS—

a 12,000-lb ingot can be powder-scarfed in 4 to 6 hours—about 1/10 the time required for grinding. Sizing of ingots, billets, and slabs, removal of hot tops, scrapping operations, and many other cutting jobs can be done in a fraction of the time previously required.



IN FABRICATING PLANTS—

a stack of twelve 10-ga., type-304 stainless sheets were powder-cut at 8 in. per min. . . . 4-in. I.D. by 8-in. O.D. flanges on ½ in., type 316 plates were made in 2 minutes of cutting time apiece.

If you work with stainless steel you will want to know more about this LINDE process. LINDE can supply the equipment you need, help you to set up, and supply the training help you need.

Linde

The word "Linde" is a registered trade-mark of The Linde Air Products Company.

THE LINDE AIR PRODUCTS COMPANY

Unit of Union Carbide and Carbon Corporation

30 East 42nd St., New York 17, N. Y. UCC Offices in Other Principal Cities

In Canada: DOMINION OXYGEN COMPANY, LIMITED, Toronto

ANOTHER *Electro* SOLUTION of AN INDIVIDUAL PROBLEM

CRUCIBLES

IRON-FREE ALUMINUM MELTING

Problem: Customer required iron-free aluminum for electrical work.

Solution: Electro Bowl Type Tercod Crucible. No iron pick up in the metal, convenience in ladling out of the pot.

ALLOYS

GAS-FREE PURE COPPER CASTINGS

Problem: Manufacturer of electrical equipment required high conductivity copper thoroughly deoxidized.

Solution: Deoxidation of copper by Electro Calcium Boride ... thorough deoxidation—no residuals from the deoxidizer as reaction products go into slag.

SAFE PORTABLE WHEELS

Problem: In grinding intricate castings, wheels frequently broke due to wedging.

Solution: Electro High-Speed, resin-bonded wheels provided additional strength so less breakage and higher production.

Electro TRADE MARK SINCE 1919

Whether your problem applies to a single operation or to a series of operations, we shall welcome the opportunity to co-operate in its solution. Write us a summary of it and we'll gladly send a Field Engineer qualified to your requirements. Back of him are Electro's Engineering and Chemical Laboratories, plussed by our Production Departments. We are justifiably proud of our 30-year record of competent co-operation in the solution of specific problems.

Electro SERVES THESE INDUSTRIES WITH THESE *Electro* PRODUCTS

METAL—Non-Ferrous and Ferrous Foundries: Steel Mills and Smelters: Brass Rolling Mills: Heat Treaters and Annealers.

CERAMIC—Potteries: Art Potteries: Manufacturers of Grinding Wheels: Sanitary Ware: Floor and Wall Tile: Electrical Porcelain: Miscellaneous Ceramic and Enamel Plants.

AUTOMOTIVE—Foundry, foundry cleaning, abrasive cutting-off, heat treating, tool room and precision grinding and finishing departments.

CHEMICAL—For applications where high temperatures or other severe operating conditions indicate the use of special refractories and cements.

SHIPBUILDING—Weld grinding, abrasive cutting-off, tool room and precision grinding, foundry, foundry cleaning, heat treating, power plant refractories.

PUBLIC UTILITIES • FEDERAL BUREAUS STATE AGENCIES • MUNICIPAL DEPTS.

ABRASIVE WHEELS—Resin-bonded, High-Speed Grinding Wheels to cover nearly every conceivable use from snagging and cutting-off operations to fine precision grinding.

CRUCIBLES—(Tercod-Conqueror) Pedestal Blocks and Pot Lids—The Carbon-bonded Crucible for melting aluminum—nickel—copper—the brasses and bronzes—zinc—silver—gold—iron, using any fuel: oil, gas, coke or coal, electricity.

REFRACTORIES—Special Refractories—Electric furnace refractories of all kinds used for:

CERAMIC KILN FURNITURE—Slabs and Posts for rigid, floating or semi-floating open construction; plate setters, tile setters, sanitary ware setters and silicon carbide saggers.

MUFFLES AND HEARTHS—One piece and sectional for enameling furnaces, tunnel kilns, assay and heat treating furnaces, pottery kilns.

CRUCIBLE FURNACE FURNITURE—Linings, covers, insulation, burner blocks.

PYROMETER TUBES—And tubes for other purposes.

BRICK—9" series or special shapes to individual specifications.

BURNER BLOCKS—Electric furnace door blocks, door frames, port blocks and electrode sleeves.

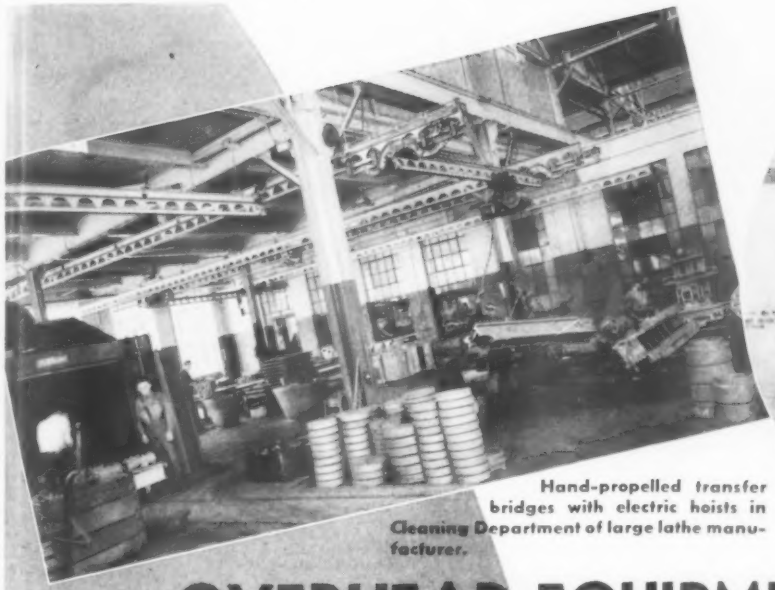
STOPPER HEADS—For steel ladles; also slag hole and tap hole blocks for Cupolas.

CEMENTS—Cements and Ramming Compositions—Of special refractories used by all industries; monolithic linings for electric, gas and oil furnaces; patching furnace walls, laying brick, boiler setting and ladle linings.

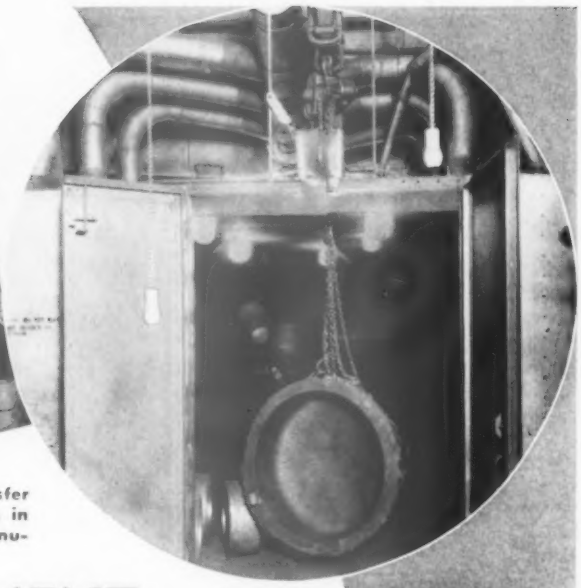
ALLOYS—Special compositions for additions, deoxidation, degasification, purification: Copper — Aluminum — Chromium — Titanium — Nickel — Silicon — Magnesium — Iron — Lithium — Calcium — Calcium Boride — Tin — Zinc — Lead.

Electro Refractories & Alloys Corporation

344 DELAWARE AVE. — *West Coast Warehouse* LOS ANGELES — BUFFALO 2, N. Y.

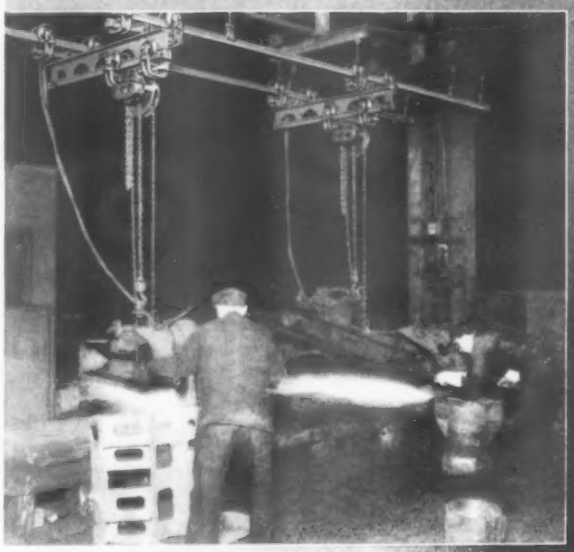


Hand-propelled transfer bridges with electric hoists in Cleaning Department of large lathe manufacturer.



Heavy castings are carried into chamber and supported on overhead tramrail during blast cleaning.

OVERHEAD EQUIPMENT *Operates Smoothly in* Abrasive Plants



Hundreds of short-span Cleveland Tramrail cranes are handling swing grinders in many plants.

In the cleaning departments where castings, forgings, billets, etc., are ground and blasted, will be found convincing proof of the design, workmanship and quality built into every piece of Cleveland Tramrail equipment. Here also is demonstrated the inherent correctness of locating materials handling facilities above and away from the floor where dust conditions are worst.

Despite blasting, piercing storms of grit, and atmospheres churning with penetrating abrasive dust, the equipment continues smooth and easy in operation — even after years of continuous service.

Dozens of Cleveland Tramrail installations are serving successfully the tough cleaning jobs of industry.

GET THIS BOOK!

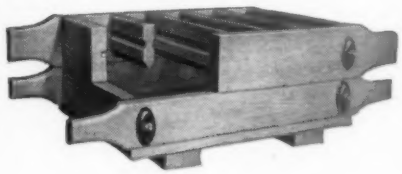
BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
3801 EAST 286th STREET *WICKLIFFE, OHIO*

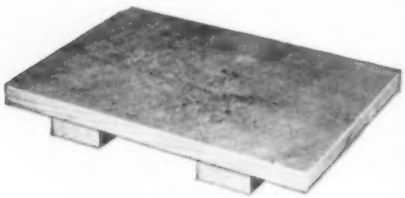
CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

CMD FOUNDRY SPECIALTIES

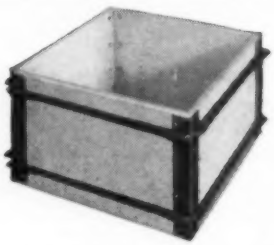
WEDGES
Hard or soft wood



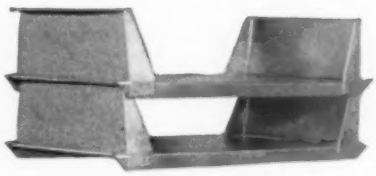
CMD WOOD FLOOR FLASKS
All sizes and shapes



CMD WOOD BOTTOM BOARDS
All sizes and shapes



CMD NON-WARP, NON-BURN SLIP JACKETS



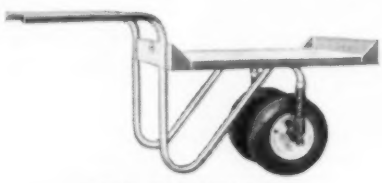
CMD DUAL-PURPOSE CORE TRAYS

CMD TYPE F CHIPPING HAMMER
Metal handle. Head has 2 chisels at right angles

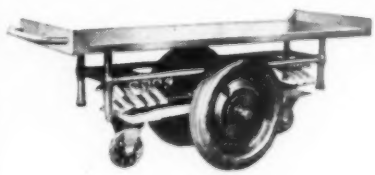
CMD TYPE A CHIPPING HAMMER
Combination drift and chisel

CMD TYPE C CHIPPING HAMMER
For general hand chipping

TEXTITE AIR SEPARATOR
Cools, cleans and dries the air in one operation. *No moving parts.* Saves air tools. Nothing to replace.



CMD PNEUMATIC CORE BARROWS
With single wheel or two wheels. (as shown here)



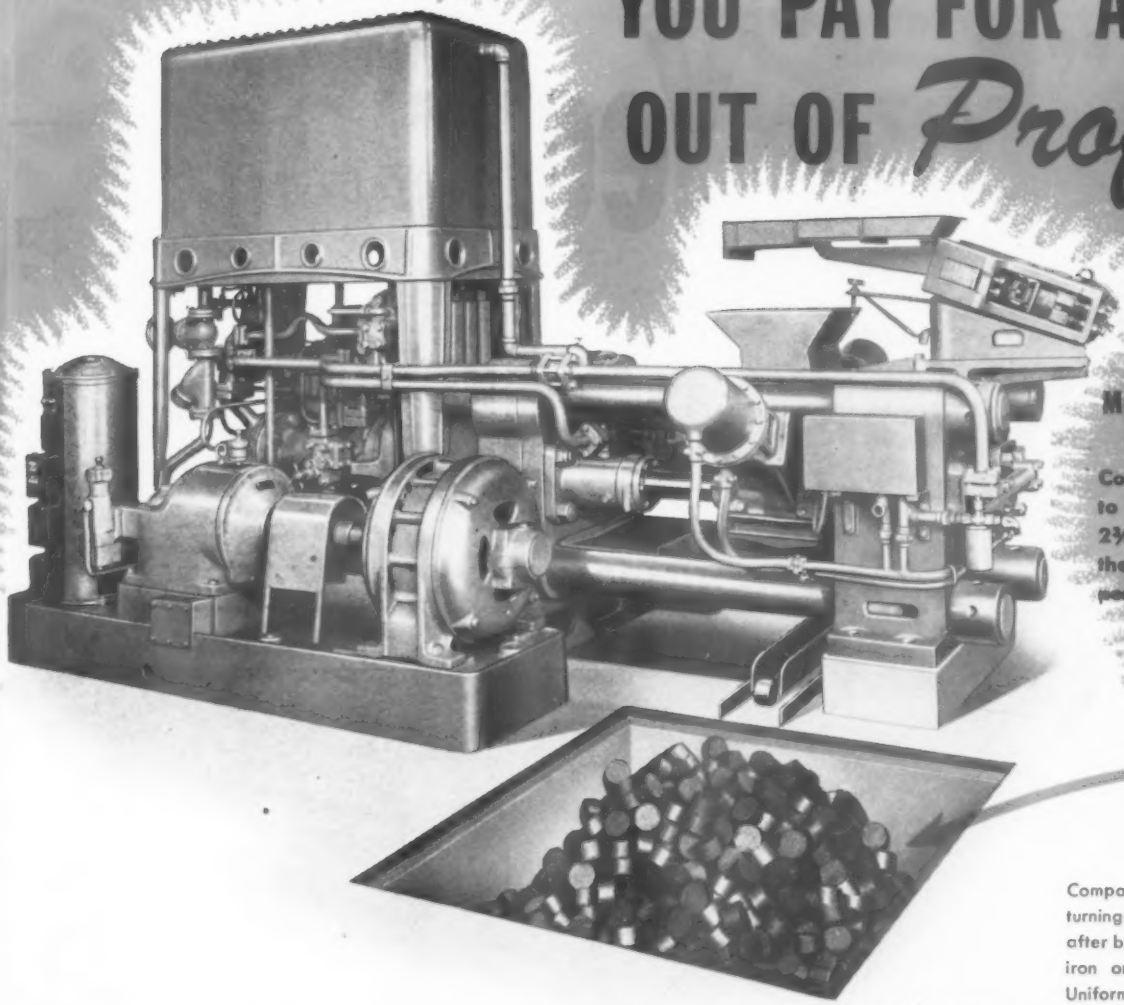
CMD PNEUMATIC CORE TRUCKS
Minimize core chafing and breakage

WRITE FOR BULLETINS
On CMD core-conveying equipment and other foundry specialties—preferred by experienced foundrymen for 25 years.

CHICAGO MANUFACTURING & DISTRIBUTING COMPANY

1928 WEST 46th STREET CHICAGO 9, ILLINOIS

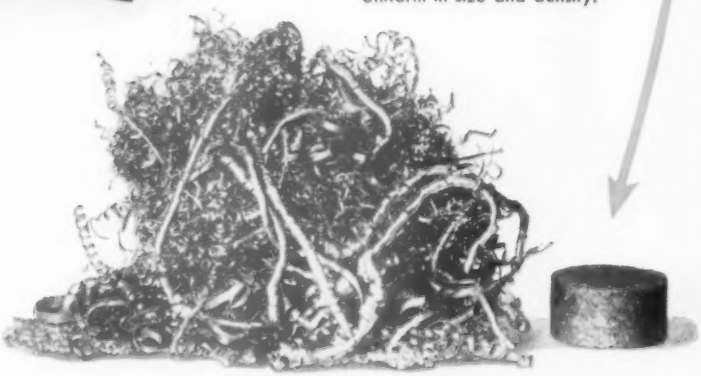
YOU PAY FOR A PRESS OUT OF *Profits!*



MILWAUKEE Hydraulic Briquetting Press

Compresses bulky scrap into compact briquettes (from 2¾" to 5" in diameter) at the rate of 720 briquettes per hour. Fully automatic.

Comparison of borings and turnings before crushing and after briquetting. Steel, cast iron or non-ferrous metal. Uniform in size and density.



Salvage Scrap PROFITABLY the Modern MILWAUKEE Way!

You get higher prices for compact briquettes than you do for bulky borings and turnings. That's why it pays to install a Milwaukee Hydraulic Briquetting Press. And, the initial cost is low. Under Milwaukee's "PAY-FROM-PROFIT" plan, no substantial down payment is required. Actually, you pay for a press out of the *additional* profits you get from briquetting, over and above the usual profits from scrap and after due allowance is made for the cost of briquetting—power, labor, maintenance, etc.

Investigate the many advantages of briquetting, then ask yourself "Can I afford NOT to own a Milwaukee Briquetting Press?" Milwaukee Engineers will gladly explain what a Press can do for YOU Write today.

Advantages of Briquetting

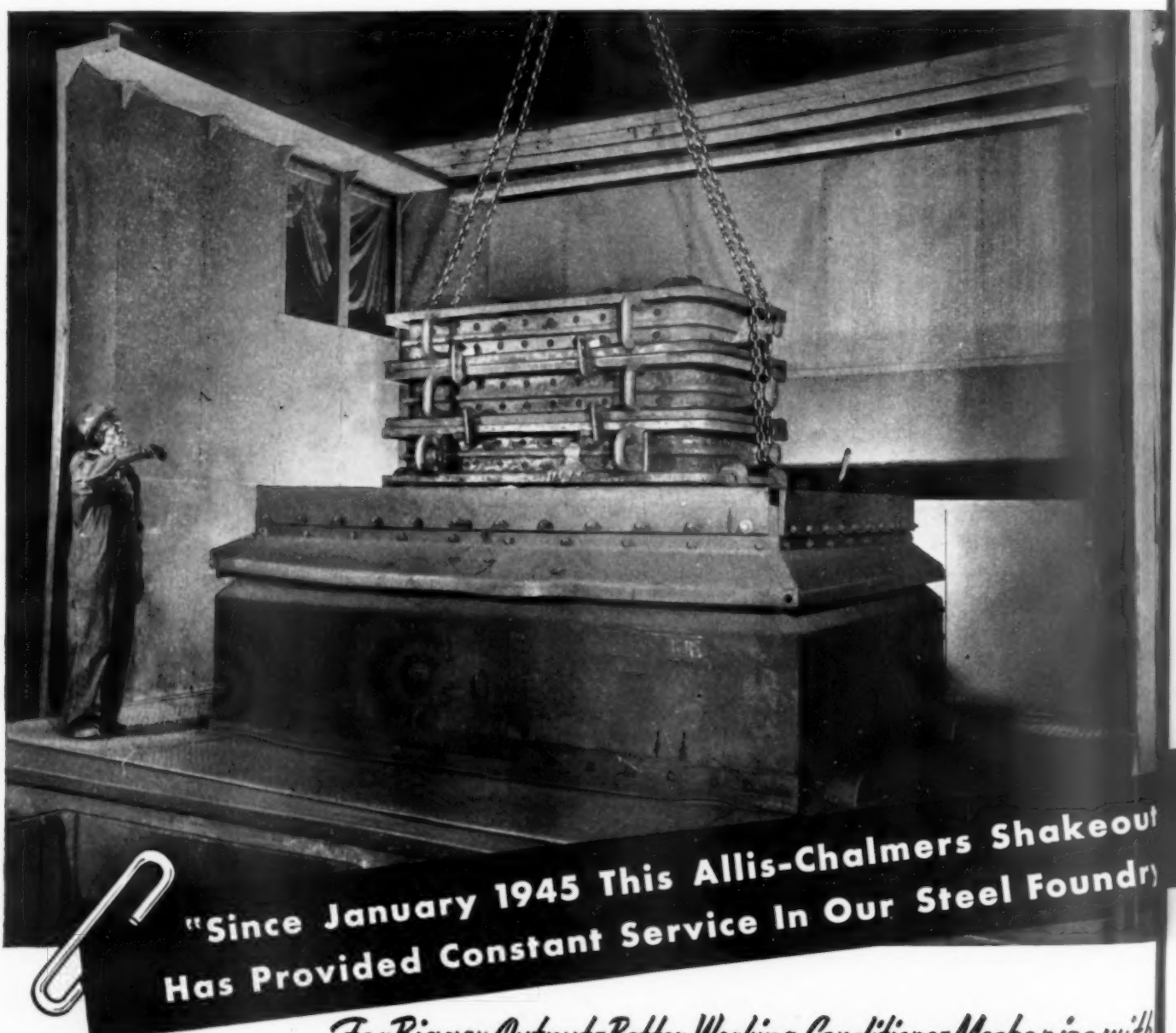
- **INCREASES SCRAP VALUE** — You get higher quality scrap with less waste.
- **CLOSER METAL CONTROL** — Briquettes give you clean, machineable metal of known analysis.
- **REDUCES METAL LOSS** — Briquettes are uniform in size and density.
- **CONSERVES SPACE** — Scrap material is disposed of daily.
- **INCREASED PROFITS** — The final result of more efficient scrap handling.

MILWAUKEE *Foundry Equipment Co.*

3236 W. PIERCE STREET, MILWAUKEE 4, WISCONSIN, U.S.A.

"Four Years of Trouble-Free Operation"

—SAYS FRED PRITZLAFF, FOUNDRY SUPT., FALK CORP.



"Since January 1945 This Allis-Chalmers Shakeout Has Provided Constant Service In Our Steel Foundry"

For Bigger Output-Better Working Conditions-Mechanize with

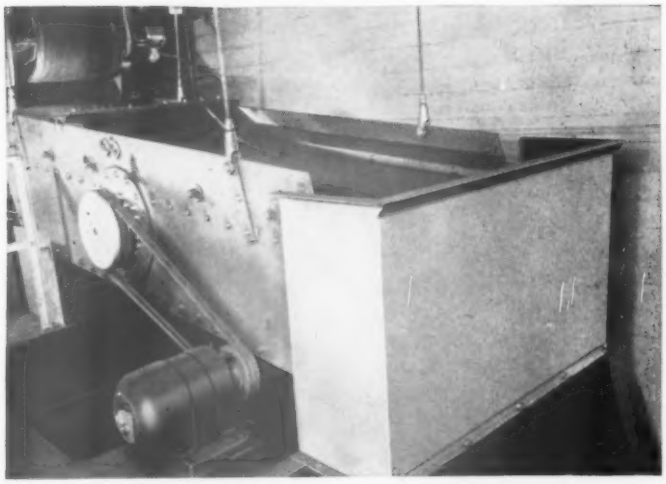
YEAR-AFTER-YEAR DEPENDABILITY of Allis-Chalmers foundry equipment is proved by this 8′ x 10′ *Foundromatic* shakeout in the steel foundry of the Falk Corporation, Milwaukee, Wis. After four years of heavy-duty use this shake-out continually handles 25-ton molds. Falk foundry downtime and maintenance costs are kept at a minimum despite constant operation.

Foundromatic 2-bearing shakeouts are supplied in sizes from 4′ x 6′ with capacity of 4 tons through 8′ x 10′ with capacity of 25 tons. They can be operated in series or parallel combination for capacities up to 100 tons.

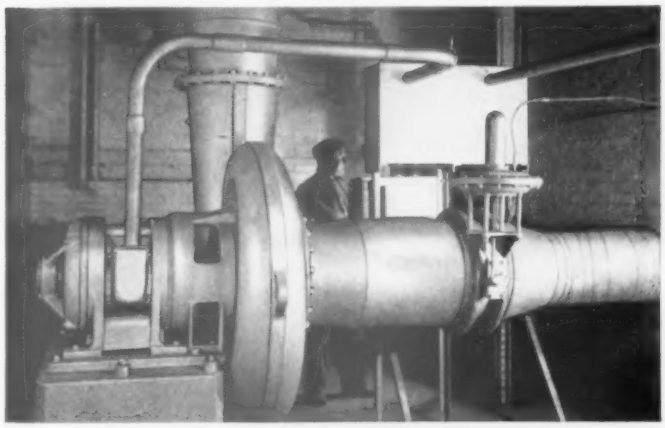
All Allis-Chalmers foundry equipment has been designed to cut production costs, better working conditions and reduce operating expense. A 2611

An experienced Allis-Chalmers representative will be glad to go over your foundry requirements with you. Consult your nearby A-C district office or write direct.

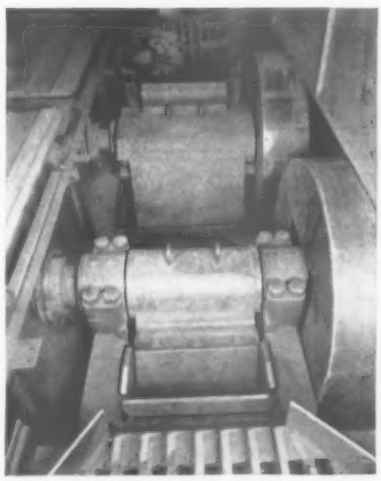
ALLIS-CHALMERS, 1032A SO. 70 ST.
MILWAUKEE, WIS.



INCREASED SAND HANDLING CAPACITY resulted from installation of this 4′ x 10′ *Ripl-Flo* vibrating screen. The screen removes refuse, breaks lumps and aerates the shakeout sand. A belt conveyer brings the sand to the screen and then conveys it to the muller. These 2-bearing inclined type Allis-Chalmers screens are available in sizes 3′ x 6′ to 6′ x 16′. Designed with cable suspension or floor mounting.



CUPOLA EFFICIENCY IS ASSURED with an Allis-Chalmers single-stage blower equipped with constant air weight. The stable operation of this 10,800 cfm A-C blower has assisted in a record of high cupola performance due to efficient combustion. Hundreds of these blowers are proving through daily use that they reduce costs and improve casting quality.



BREAKING UP CORES after castings have been removed is a common application for Allis-Chalmers Fine Reduction jaw crushers. In the aluminum foundry shown here, seven A-C jaw crushers are used to break up cores. Nine tons per hour can be handled by each crusher. Compactly placed back to back next to the shakeouts, they separate steel rods from the molds with none of the difficulty experienced with machines formerly used.

Foundromatic, Ripl-Flo, Low Head are Allis-Chalmers Trademarks.

ALLIS-CHALMERS

Pioneers in Power and Electrical Equipment — Biggest of All in Range of Industrial Products

Sand at your fingertips — mass production at its best. Production at a profit, too, with Jeffrey high-speed molding stations, mold conveyors, flask fillers, sand handling and conditioning equipment on the job. Single units or complete systems — give us a chance to make recommendations.

THE JEFFREY MANUFACTURING COMPANY

ESTABLISHED 1877

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Complete Line of Material Handling, Processing and Mining Equipment

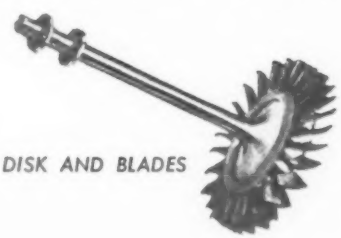
"ELECTROMET" Trade-Mark TUNGSTEN

STRENGTH-BUILDER FOR THE HIGH-TEMPERATURE SUPER-ALLOYS

TYPICAL APPLICATIONS OF HIGH-TEMPERATURE ALLOYS

BLADES FOR JET ENGINES

TAIL CONES FOR JET ENGINES



GAS TURBINE SHAFT, DISK AND BLADES

What does it take to make a super-alloy?

Most of the so-called "super-alloys" that have been created for high-temperature service are made up of several metals so that it is almost impossible to say which should get most credit for each of the desirable properties that the alloys have. Many contain tungsten, which increases the hardness and the strength of the alloys at high temperatures. Creep strength shows improvement, too.

The percentage of tungsten in these high-temperature alloys depends upon the physical properties desired and the service temperatures to be met. All of the alloys can be readily cast and some can be forged and rolled without difficulty. Some typical applications in gas engines are rotors, exhaust stacks, tail cones, and turbine blading.

For the manufacture of high-temperature alloys, "Electromet" supplies a high-quality ferro-tungsten conforming to A.S.T.M. Specification A144-39. This ferro-alloy contains 70 to 80 per cent tungsten and a maximum of 0.60 per cent carbon. It is available for immediate delivery in a crushed size of ¼ inch by down which is suitable for all electric furnace additions.

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HINES PINS

WILL NOT RUST OR STICK

NO LUBRICANT REQUIRED

HARDENED... GROUND AND CHROME PLATED

THE HINES

3431 WEST 140th ST.

AND BUSHINGS

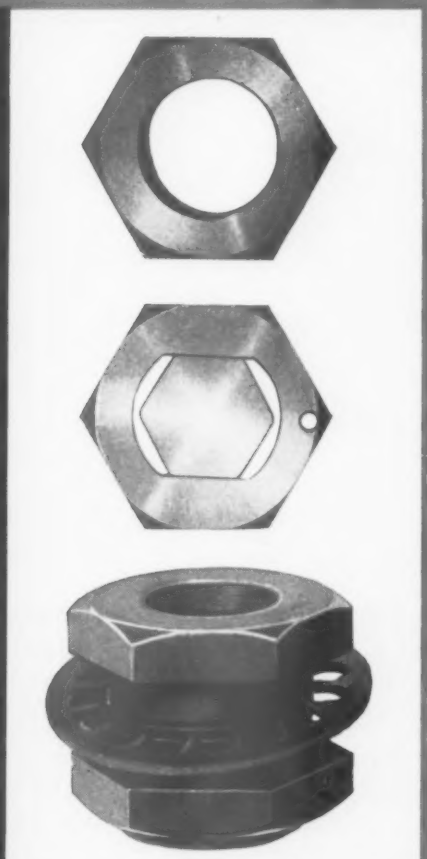
FOR ALL PATTERN PLATES AND FLASKS

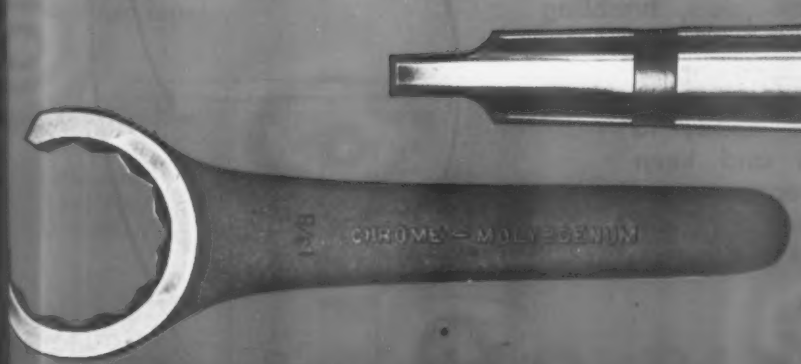
Supply your pattern department with Hines Pins and Bushings and you automatically eliminate a great source of their troubles.

THE PINS—Round or Hexagon, hardened, ground and chrome plated. Extremely accurate, will not stick or rust. Made in various sizes with long or short shanks.

THE BUSHINGS—Round or oblong, held in place by simple lock washer and jam nut. Easy to install or replace. Note broad wearing surface of these hardened bushings in illustration at right. Made in two lengths—short for flasks and pattern plates up to ½" thick, and long for pattern plates ½" to 1" thick.

Write for Complete Details and Prices





TOOLS FOR INSTALLATION

This counterboring tool and wrenches are the only tools needed for any installation of Hines Pins and Bushings.

FLASK CO.

CLEVELAND 11, OHIO

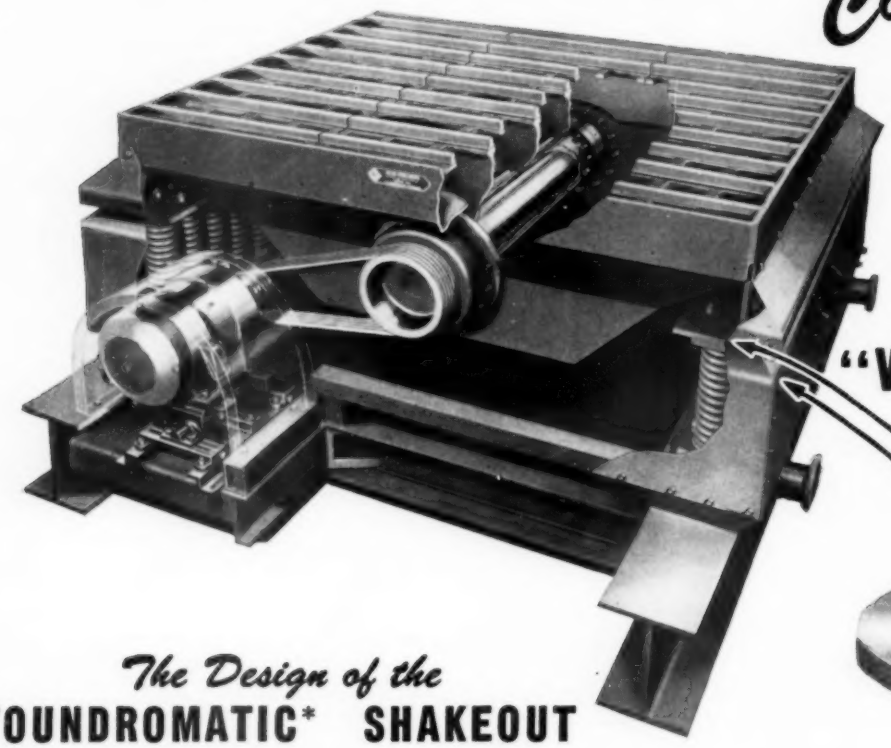
FABREEKA *With Coil Springs*

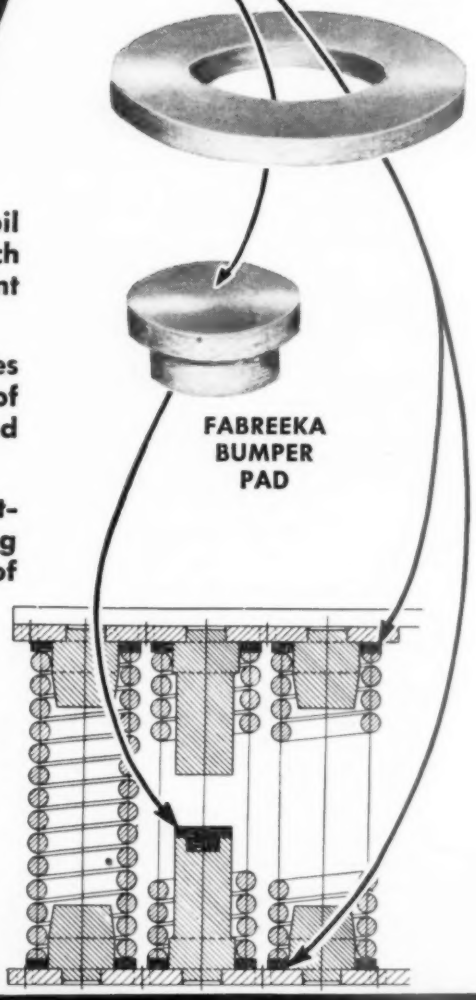
PREVENTS

TRANSMISSION OF IMPACT SHOCK AND VIBRATION—

Reduces

"WEAR & NOISE"





The Design of the

FOUNDROMATIC* SHAKEOUT

Built by ALLIS-CHALMERS incorporates Fabreeka Coil Spring Pads above and below the support springs which carry the weight of the shakeout and flask, and prevent transmission of vibration to the foundation.

The FOUNDROMATIC* SHAKEOUT also incorporates Fabreeka Spring Bumper Pads to limit the compression of the support springs to prevent stressing the springs beyond their limitation.

Fabreeka pads, bushings, and washers installed as mountings under shakeout machines, jolt moulders, tumbling barrels and other heavy machinery reduce the effects of heavy impact shocks and destructive vibration.

Fabreeka has long demonstrated its ability to prevent breakage of machine parts and keep bolts tight, thereby reducing maintenance and increasing production . . . Moreover, Fabreeka has long life, which makes its final cost a low cost.

Write for Latest Literature

*an Allis-Chalmers trademark

It Pays To Specify Fabreeka

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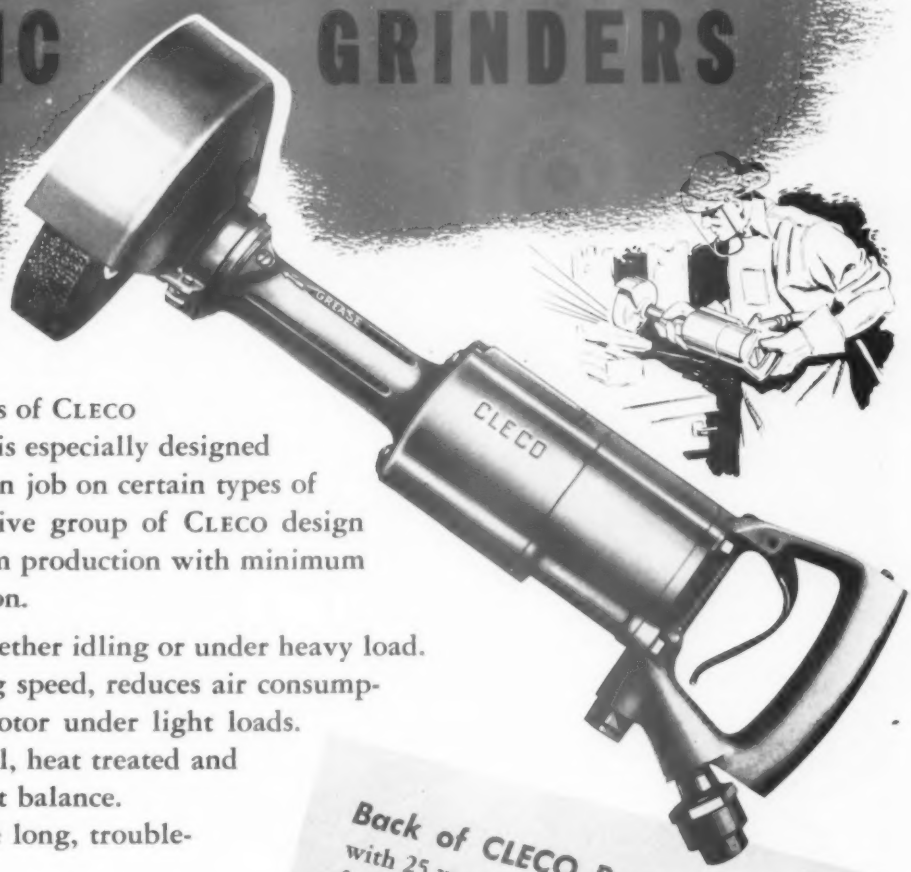
222B SUMMER STREET BOSTON 10, MASSACHUSETTS

Grind down Production Costs with CLECO PNEUMATIC GRINDERS



There are many sizes and styles of CLECO Pneumatic Grinders. Each one is especially designed to do an outstanding production job on certain types of work and each has the exclusive group of CLECO design features that result in maximum production with minimum service and low air consumption.

- Governor controls speed, whether idling or under heavy load. Permits most efficient operating speed, reduces air consumption and prevents racing of motor under light loads.
- One piece rotor of alloy steel, heat treated and ground. Constructed for perfect balance.
- Wide impeller blades assure long, trouble-free service life.
- Made in a wide range of sizes for all steel grinding and polishing purposes.

Also available: Die grinders for light finishing or forging dies, metal patterns and similar work.

Back of CLECO Products . . . with 25 years experience in precision manufacturing, is the REED ROLLER BIT COMPANY, one of the largest companies of its kind in the world.

We assure you: The most advanced engineering • Uniform and standardized quality products • World-wide distribution and complete service facilities traditional with REED.

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CLECO AIR TOOLS

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CLECO DIVISION

of the REED ROLLER BIT COMPANY, P. O. Box 2119, Houston, Texas, U.S.A.

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In Canada: Cleco Pneumatic Tool Company of Canada, Ltd., 927 Millwood Road, Toronto (Leaside), Ontario

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FERROCARBO Briquettes

TRADE MARK

Fluidity Spiral of white iron made by the duplex cupola-air furnace process utilizing FERROCARBO briquettes. Notice the unusual length of this spiral and the even fracture of the gate.

FERROCARBO briquettes are proving particularly effective in producing consistently prolonged metal fluidity. A number of fluidity spirals of white iron made by the duplex cupola-air furnace process, with FERROCARBO briquettes in the charge, confirm this fact. The one that is illustrated is a typical example.

Plant records, showing a substantial reduction in misruns, shrinks and hot tears, add further proof that hotter, more fluid iron is being produced with FERROCARBO briquettes in the charge.

Other advantages are also provided by this new development in duplex malleable iron melting. For a more thorough and detailed understanding, we suggest a discussion with our metallurgical staff at your earliest convenience.

FERROCARBO Briquettes
BY CARBORUNDUM

TRADE MARK

THE CARBORUNDUM COMPANY, Abrasive Grain and FERROCARBO Division, Niagara Falls, New York

FERROCARBO Distributors: Kerchner, Marshall & Co., Pittsburgh, Cleveland, Birmingham, Philadelphia and Buffalo; Miller and Company, Chicago, St. Louis and Cincinnati

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Cuts grinding time in half

Savings pay for tools in 5 months

THIS manufacturer of materials handling equipment was using universal electric grinders when the Rotor Application Engineer called to find ways of cutting grinding costs. The Rotor Application Engineer recommended replacement with Rotor Air Grinders and demonstrated them with these results:

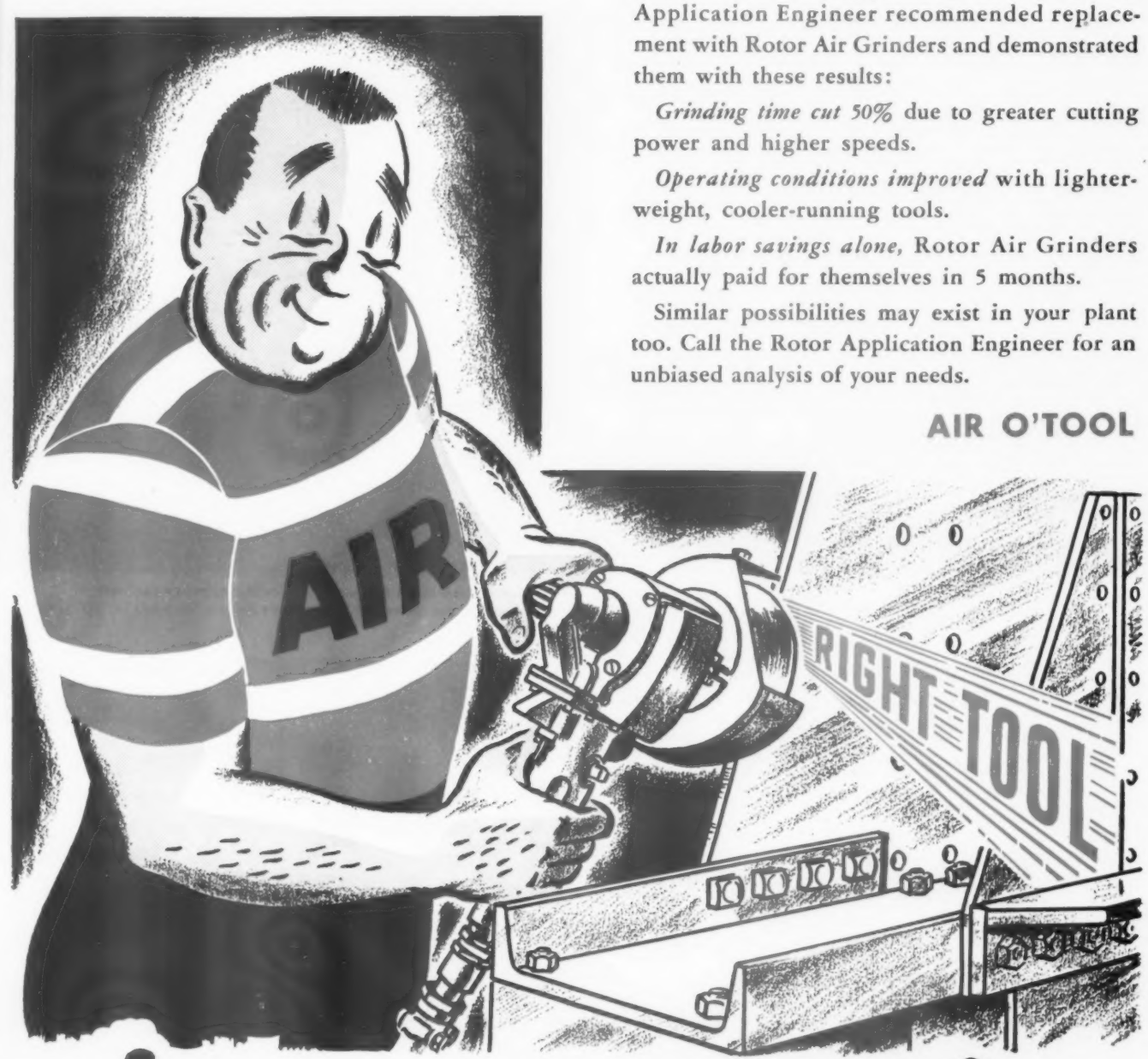
Grinding time cut 50% due to greater cutting power and higher speeds.

Operating conditions improved with lighter-weight, cooler-running tools.

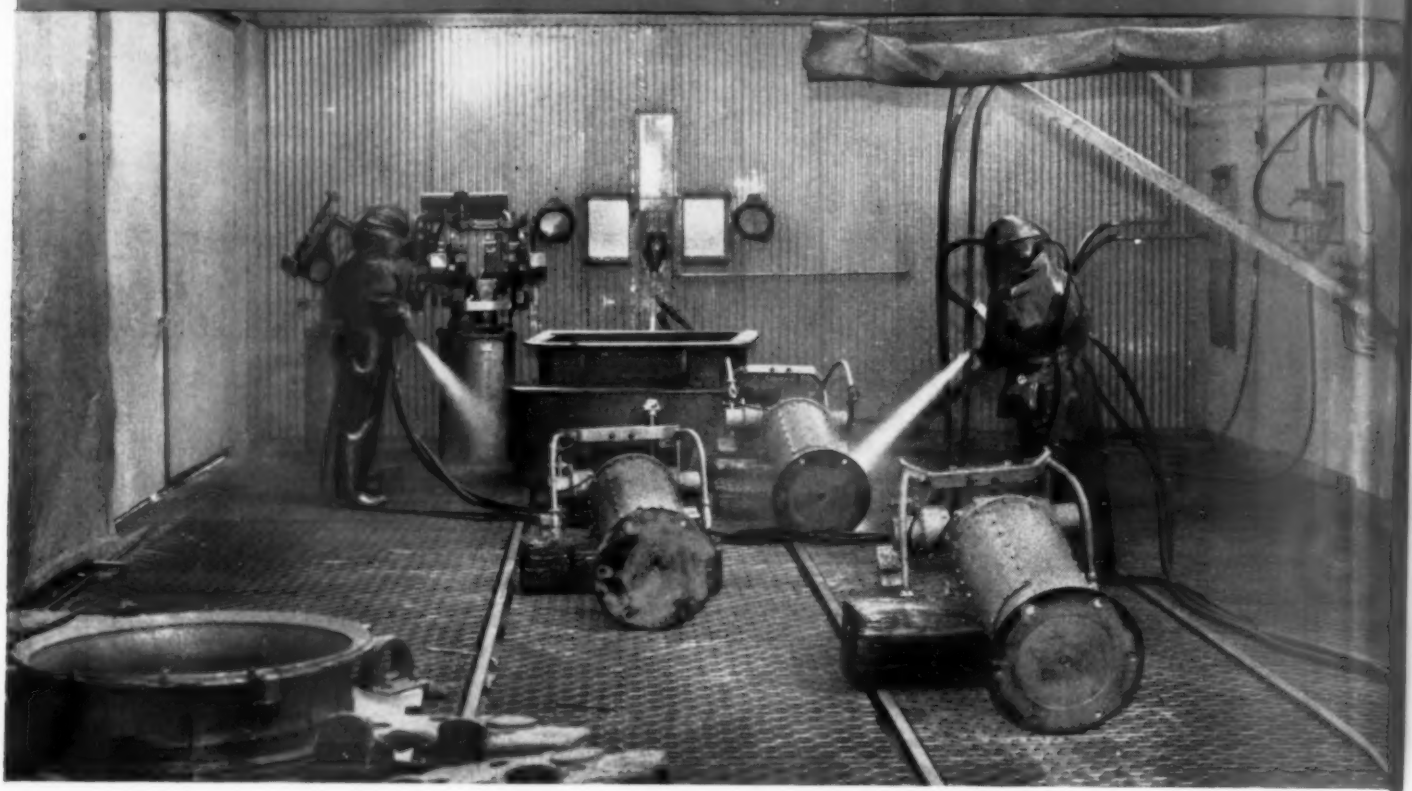
In labor savings alone, Rotor Air Grinders actually paid for themselves in 5 months.

Similar possibilities may exist in your plant too. Call the Rotor Application Engineer for an unbiased analysis of your needs.

AIR O'TOOL



Philadelphia Navy Yard Cleans Castings



Two guns in operation in the Hydro-Blast enclosure. At the far end, center, is the turn-table for large, heavy castings; and behind it is a Hydro-Blast high-gallonage gun controlled from outside.

◀ Operator directs high-gallonage Hydro-Blast gun from outside the enclosure, at castings on a turn-table. The foot-lever controls an air hoist which raises and lowers the swivel-mounted gun.

An auxiliary turn-table half inside and half outside the enclosure, with a dividing partition. While castings on the inner half are being cleaned by the Hydro-Blast, the outer half is being loaded. ▶

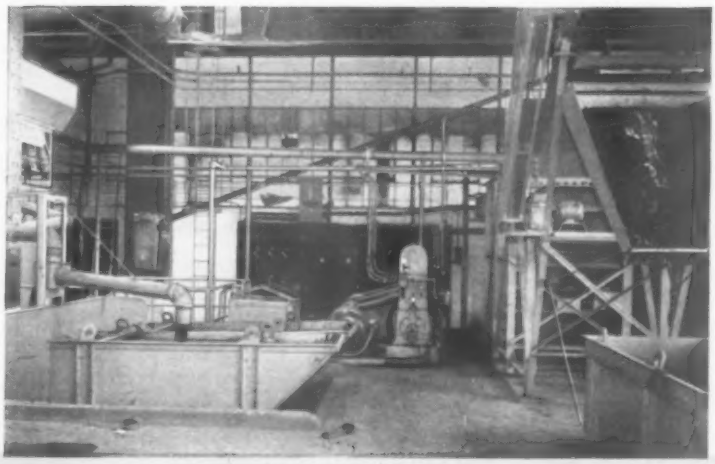
HYDRO-B

2550 NORTH WESTERN AVE. CH

with HYDRO-BLAST

▲ At the left, the turn-table for heavy castings, and the higher-gallonage gun controlled from outside the enclosure. At the right is the auxiliary turn-table for smaller castings.

Shown below are the sand classifier at the upper left, and sand dewatering boxes in the left foreground; in the center, high pressure pumps with motors, and panel board in the rear; ▼ at the right, sludge disposal equipment.



Castings are cleaned a great deal faster and at much lower cost at the Philadelphia Yard since the installation of the Hydro-Blast method. In addition, the Hydro-Blast has proved to be an effective means of reducing dust in the foundry air.

These same benefits—cleaning castings faster, cleaner air and good, clean savings—can be yours, through using a Hydro-Blast installation designed to meet your individual requirements. It costs nothing to investigate—and may be costing you a good deal not to. It's time well invested to talk about it with Hydro-Blast engineers.

-BLAST CORPORATION

CHICAGO 47, ILLINOIS

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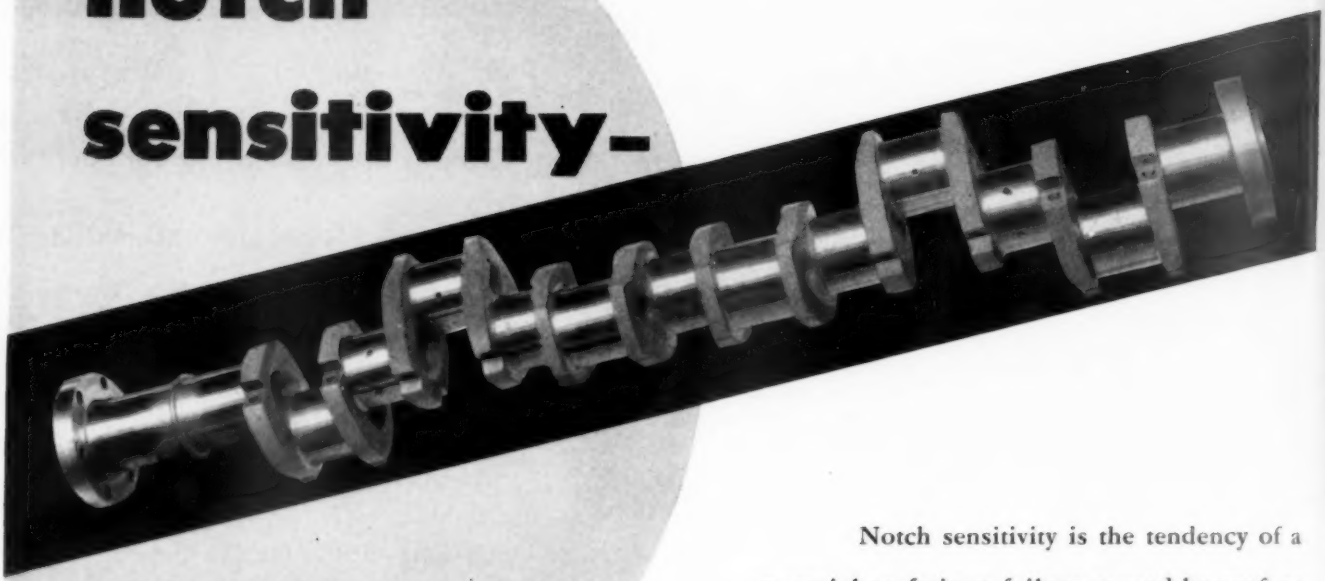
England, Norway, Sweden, Denmark and Finland — Pneulec Limited, Licensee, Smethwick (near Birmingham) England

France and Switzerland—R. Dureuil, 4 Square Du Graisivaudan, Paris 17, France

Belgium—Charles Monseur, 195 Rue Saint Leonard, Liege, Belgium

notch sensitivity—



cause and cure

Notch sensitivity is the tendency of a material to fatigue failure caused by surface discontinuities—toolmarks, sharp corners, etc.—points of high stress concentration.

Gray Iron has very high resistance to notch sensitivity. Repeated stresses, instead of causing a fracture from a notch, are diffused by the graphite in Gray Iron so that failure of the part is avoided.

Crankshafts, like the one above, illustrate this and other qualities of Gray Iron such as rigidity, vibration absorption and superior bearing characteristics.

For thousands of products, Gray Iron provides a winning combination of useful properties not found in any other material . . . plus ultimate economy.

Write for free booklet, "GRAY IRON—Its Mechanical and Engineering Characteristics, and Details for Designing Cast Components".

Make It Better With Gray Iron

Gray Iron Characteristics Include:

- Castability
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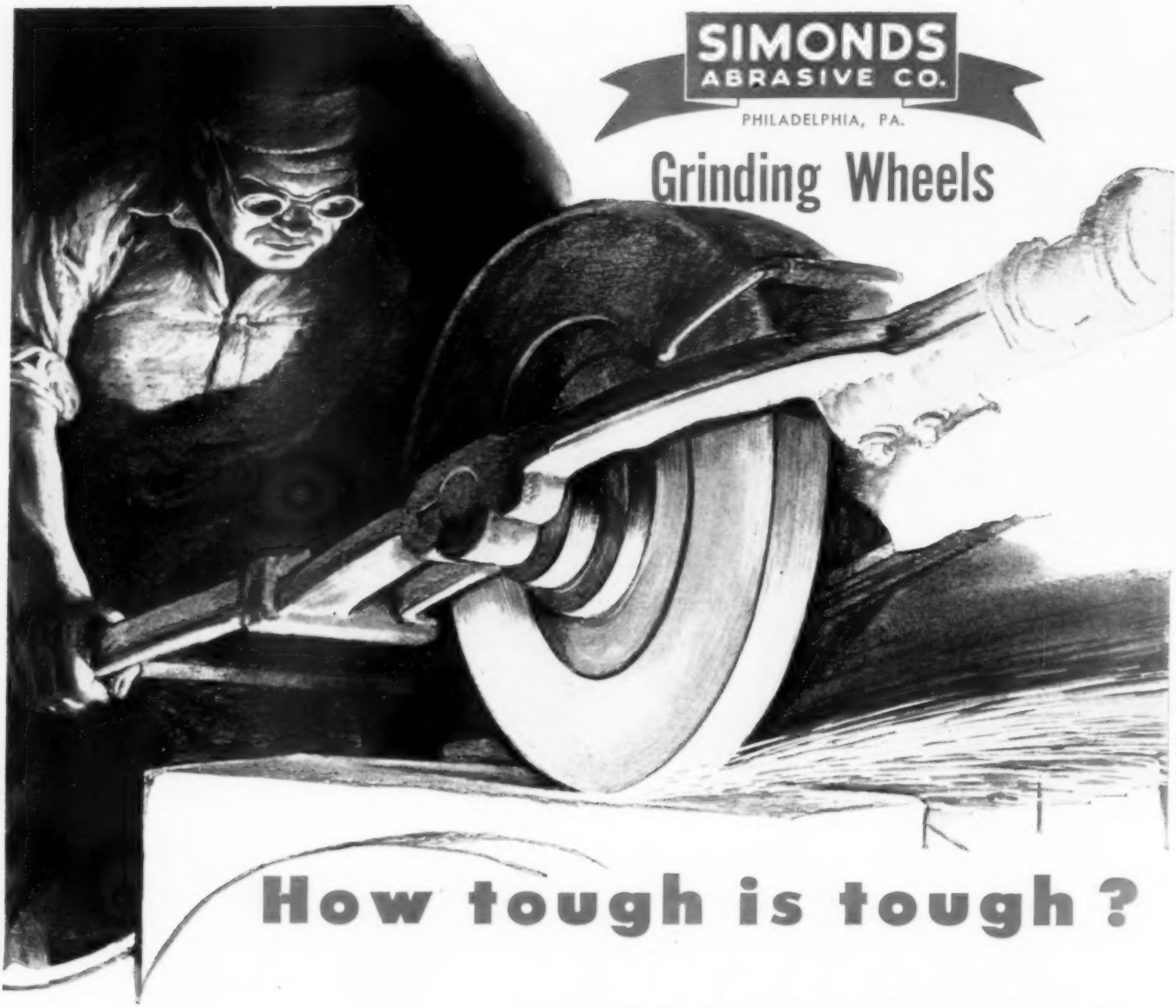
Let us discuss your individual problem!

SWINDELL-DRESSLER CORPORATION

Designers and Builders of Modern Industrial Furnaces

PITTSBURGH 30, PA.



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ABRASIVE CO.
PHILADELPHIA, PA.

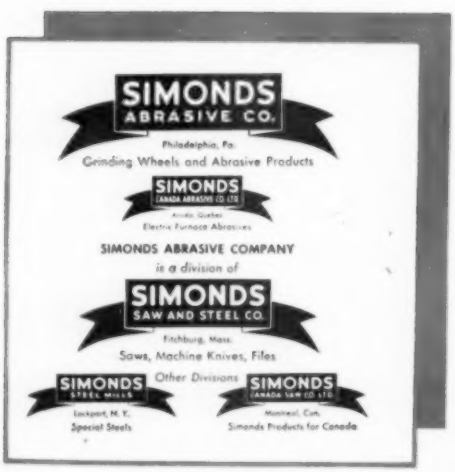
Grinding Wheels

How tough is tough?

A grinding wheel is tough . . . plenty tough when it takes the severest operating use at 9,500 surface feet per minute . . . yet cuts fast and stands up to give you lowest wheel cost per pound of metal removed.

That's what you get from Simonds Abrasive Co. Snagging Wheels for cleaning castings and billets . . . as well as from other kinds of Simonds Abrasive Wheels used in the precision grinding field.

Send for your copy of our Grinding Wheel Data Book giving complete information including recommendation tables and address of nearest distributor equipped to serve you locally.



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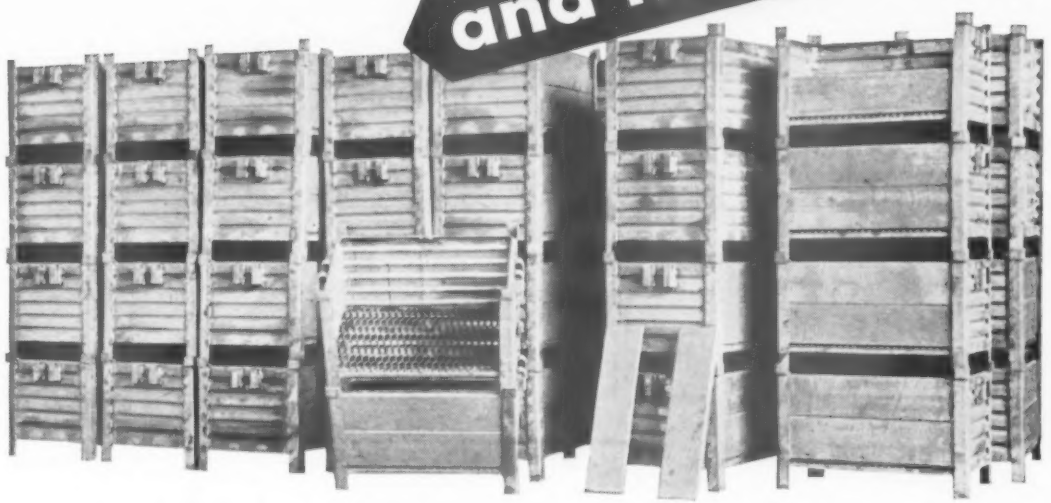
OPEN SIDE STEEL BOXES

speed efficiency

through side-loading and tiering



● Look at the advantages of Truscon Open Side Steel Boxes: *They save space!* Tiered boxes use only the floor space required for the bottom box. • *They save time!* No stacking and unstacking to get at stock; open sides make contents of boxes available at all times. They save labor! Because they save time. • *They aid inventory!* Always open, or easily opened for counting and inspecting stored stocks. • *They aid production!* Workers can select materials quickly and easily. Materials can be grouped by size, type and thickness. • *They aid shop maintenance!* By occupying small floor space and by being transportable while tiered, Truscon Steel Boxes make it easy to keep shop floors clean and repaired.

Truscon Open Side Steel Boxes are made in various sizes to fit individual requirements. They are fabricated from heavy gauge steel sheets of uniform thickness, into which deep reinforcing ribs are pressed to produce maximum strength and rigidity. Despite their rugged construction, they are comparatively light in weight, and can be used for any type of commodity, with hand or power lift trucks or cranes.

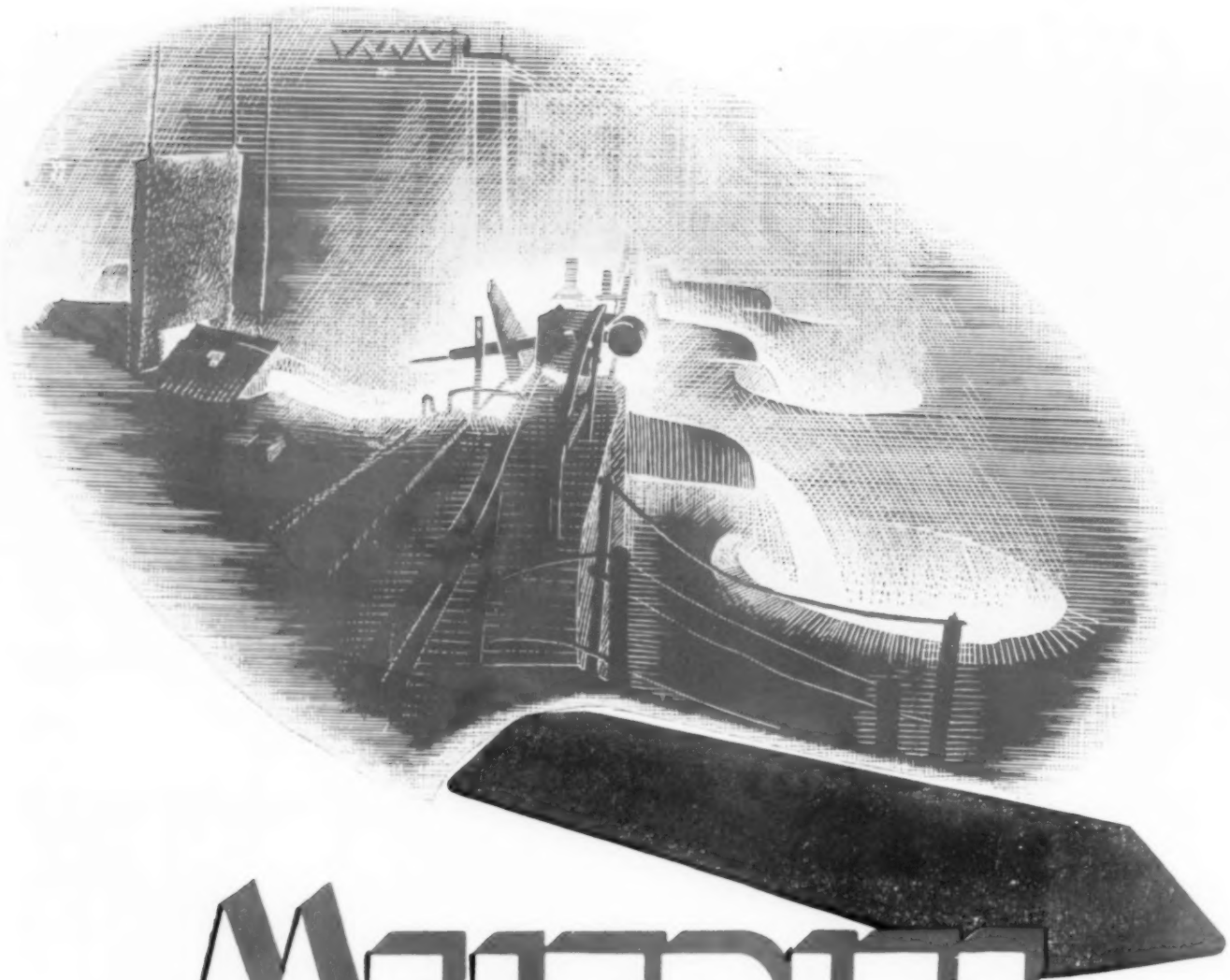
Investigate the possibilities of using Truscon Open Side Steel Boxes in *your* plant . . . and enjoy the advantages these efficient material handlers can give you.

Write for Truscon Materials Handling Equipment Catalog, which shows entire line of Steel Boxes and Skids, complete with illustrations and specifications.

TRUSCON STEEL COMPANY

PRESSED STEEL DIVISION • 6100 TRUSCON AVENUE • CLEVELAND 4, OHIO

SUBSIDIARY OF REPUBLIC STEEL CORPORATION



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PIG IRON

UNIFORMITY OF ANALYSIS

MORE USED THAN ANY OTHER MERCHANT PIG IRON

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PICKANDS MATHER & COMPANY

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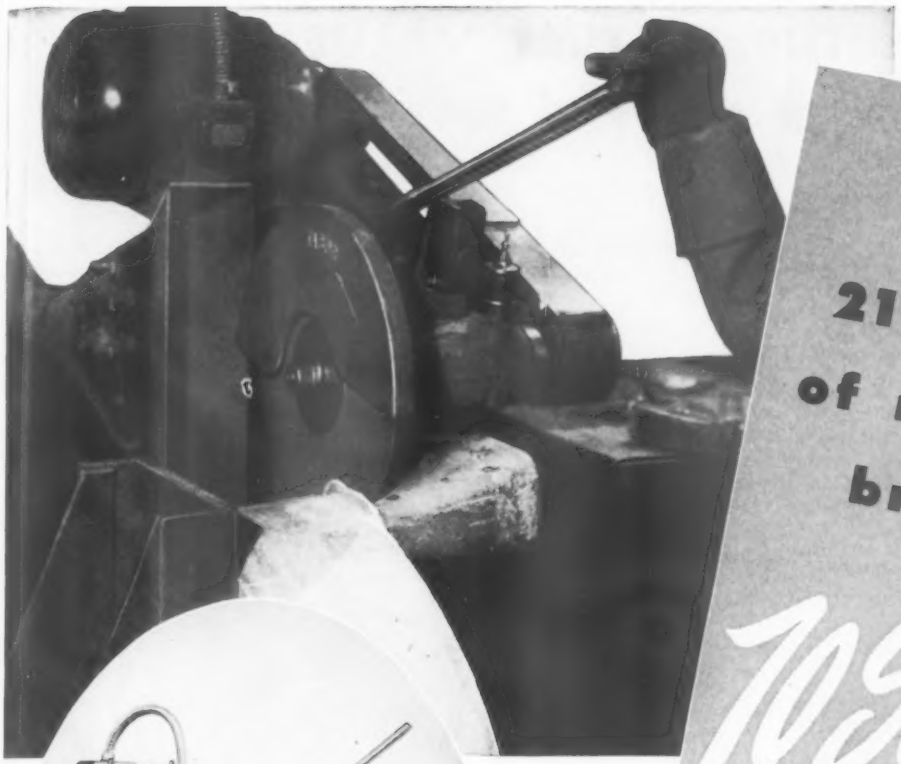
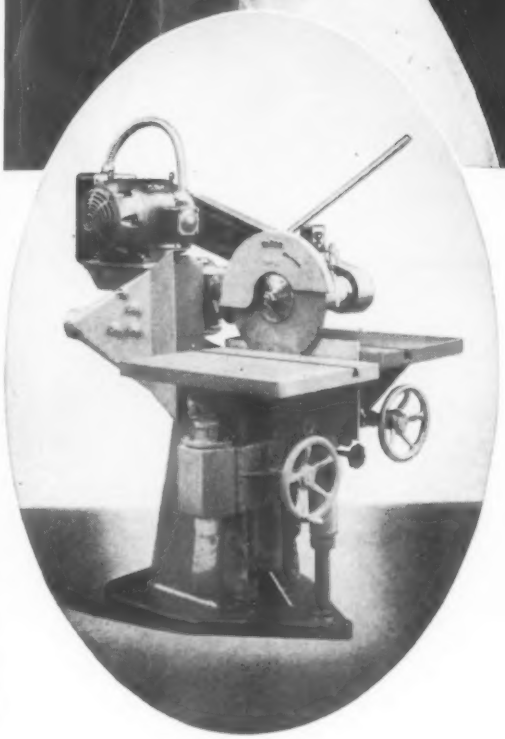
GREENSBORO • INDIANAPOLIS • MINNEAPOLIS • ST. LOUIS • WASHINGTON

IRON ORE • PIG IRON • COAL • COKE

SIXTY-SIX YEARS OF
SERVICE TO INDUSTRY



Through 21 sq. inches of manganese bronze in *10 Seconds!*



That's a mighty fast cut for a 16" wheel driven by a 10 H.P. motor—a good example of how top-speed production schedules are "meat" for Tabor-Brasive Cut-Off Machines.

These rugged machines cut gates and risers from non-ferrous and ferrous castings in a matter of seconds. Clean, close cuts, too, that slash snagging and finish-grinding costs to the bone—often do away with them entirely.

And for the *really tough* cutting jobs—in steel foundries—in copper cutting (either gates and risers or crucible feed stock)—wherever the going's the toughest, Tabor makes a big-value 15 H.P. cut-off.

Any way you look at it, a Tabor-Brasive Cut-Off Machine—equipped with today's hard-to-break, safe-to-use wheels—is *your* answer to more cuts at less cost, with safety.

Write, wire or 'phone for more details.

SPECIFICATIONS

Motor	Table Size (Split Type)	Wheel Diam.	Max. Height of Work Under Wheel
10 H.P.	36" x 25"	16" Max. Thickness—5/32"	20" (with head over table) 46" (with head swung to side)
15 H.P. (Two Speed)	41" x 30"	20" Max. Thickness—3/16"	18" (with head over table) 44" (with head swung to side)
All motors fully enclosed, fan-cooled, ball bearing			

REPRESENTATIVES
Snyder Foundry Supply Company, Los Angeles, Calif.; The Pacific Graphite Company, Inc., 40th & Linden Sts., Oakland 8, Calif.; Carl F. Miller & Company, Seattle, Washington; M. W. Warren Coke Company, 1017 Olive Street, St. Louis 1, Mo.; E. R. Frost Company, Inc., Minneapolis 14, Minn.; Harry H. Reich, Trussville, Ala.

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The TABOR *Manufacturing Co.*

SINCE 1884 MANUFACTURERS OF FOUNDRY MOLDING MACHINES
6225 TACONY STREET • PHILADELPHIA 35, PENNA.

DUSTUBE IS THE FEATURE VALUE
from every point of view...

FOUNDRY SUPERINTENDENT—Mr. F. T. Hartman
(American Malleable Castings Co.)

"We take a great deal of pride in the cleanliness and dust free condition of our foundry. The Dustube Dust Collector is an important unit in maintaining this condition. All of our cleaning machines are ventilated by the Dustube and dust around these units is a thing of the past. Our operating costs are confined to supplying power for the fan and shaker — this is exceptionally low due to the ample spacing of tubes, which decreases resistance to air flow."

MASTER MECHANIC—Mr. H. H. Neiser
(American Malleable Castings Co.)

"After the unfavorable experience we had with our ——— type dust collector, the Dustube is the most trouble-free unit I have ever seen. There has been absolutely no maintenance. In the past year we have never changed even one tube — this is probably due to the fact that the tubes are never under tension or in contact with metal which would corrode and abrade the cloth fabric."

CLEANING ROOM SUPERINTENDENT—Mr. Dale Ward
(American Malleable Castings Co.)

"Our Dustube Dust Collector has given us so little trouble that were it not for the fact that our cleaning room is so completely free of dust, we would have forgotten that it is there as all. However, several features of the Dustube have been favorably impressed upon me: The first being the fast and thorough methods of removing accumulated dust from the bags; secondly, the absence of any bridging of dust or clogging of the tubes; and lastly, the long life of the cloth tubes."

DUSTUBE ADVANTAGES

BETTER DUST REMOVAL—Simple, fast, thorough. Shortens cleaning time.

POWER SAVINGS—Lower resistance to air flow. Lower air velocities.

HIGH EFFICIENCY—Nearly 100% efficient by convincing tests.

EASE OF INSPECTION—Clean, safe, simple. No parts to remove.

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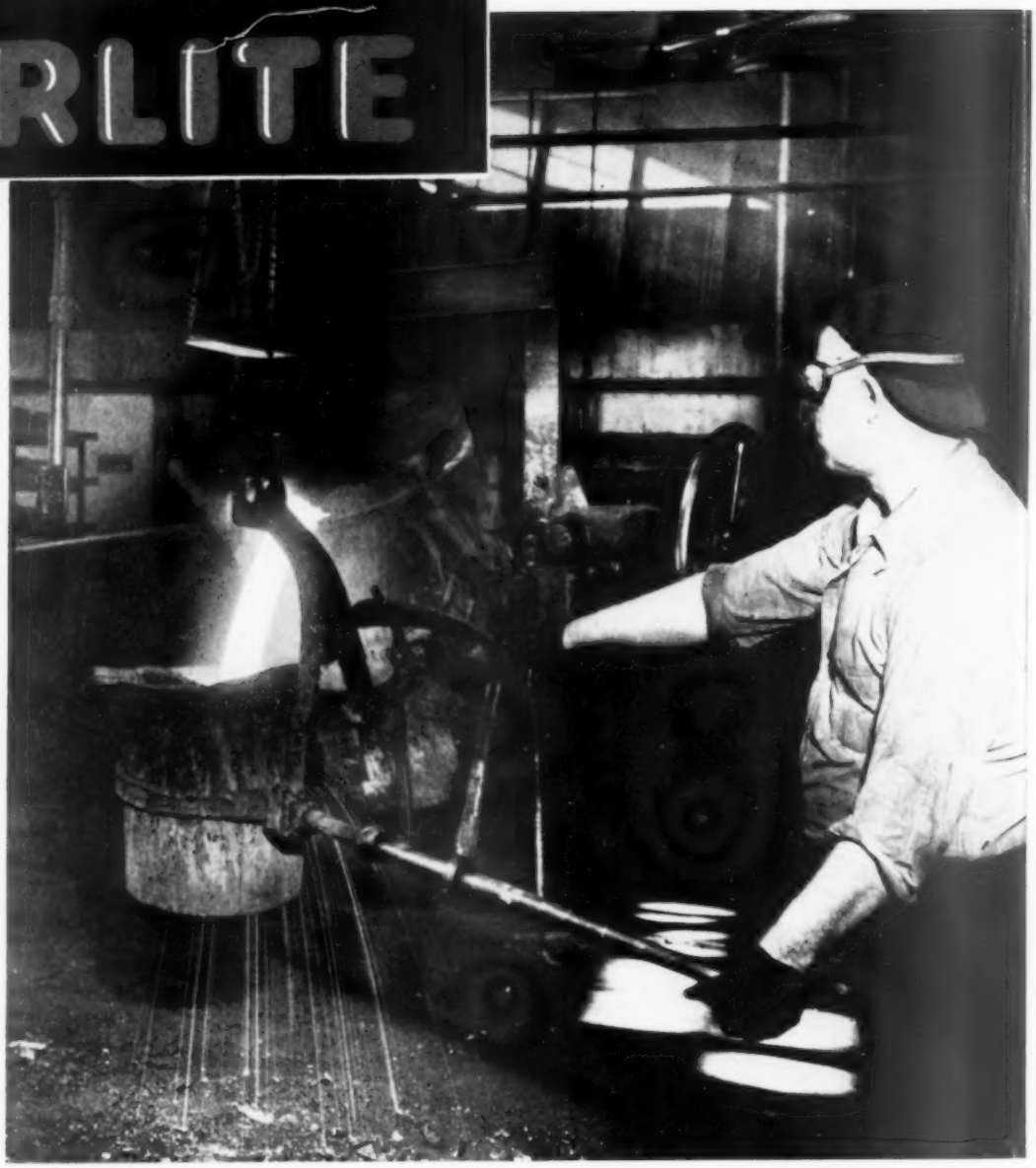
IRONTON BERLITE



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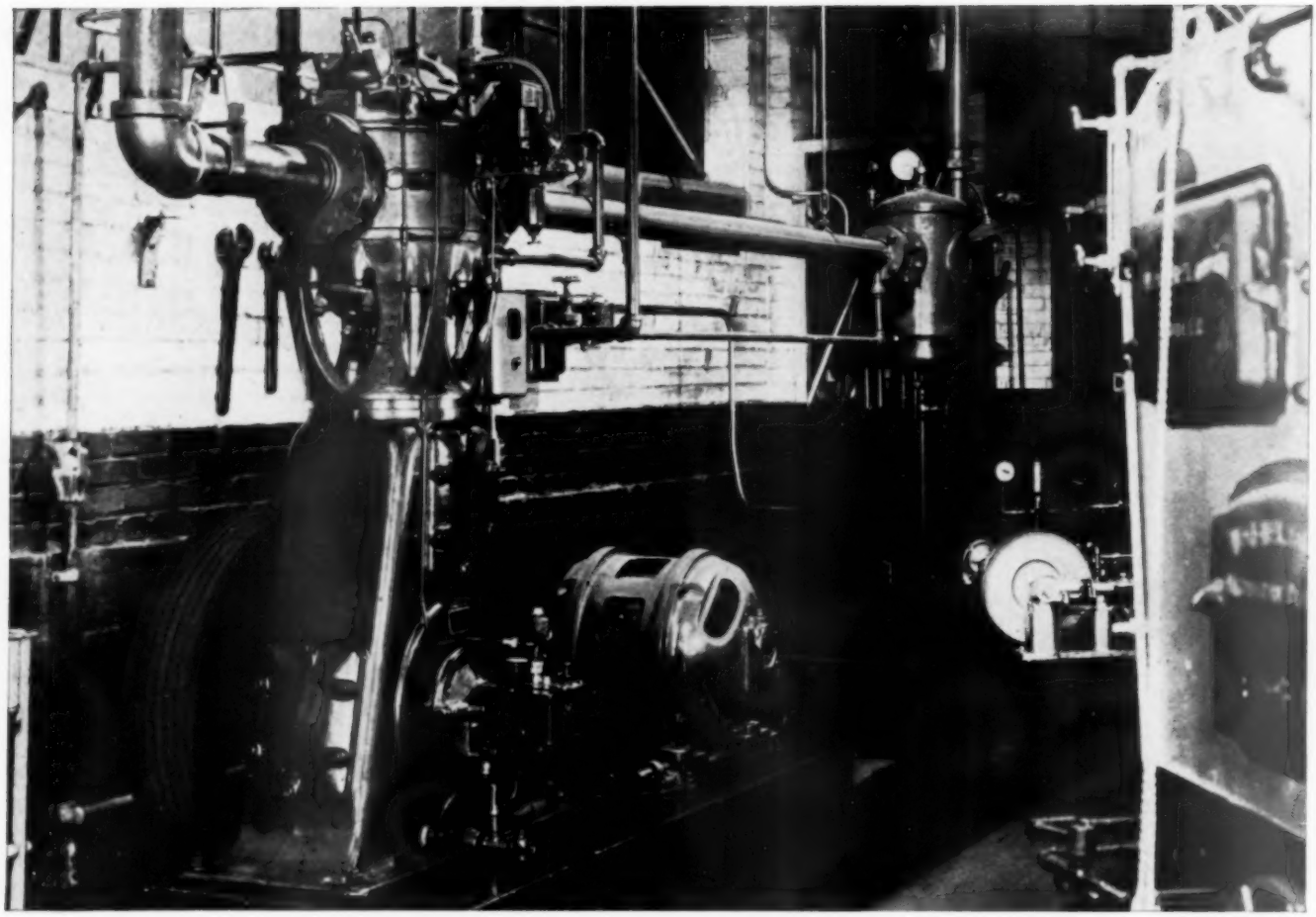

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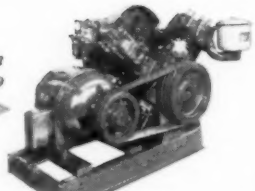

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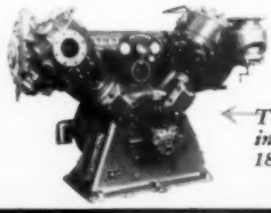

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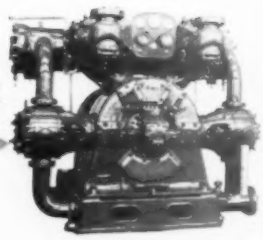

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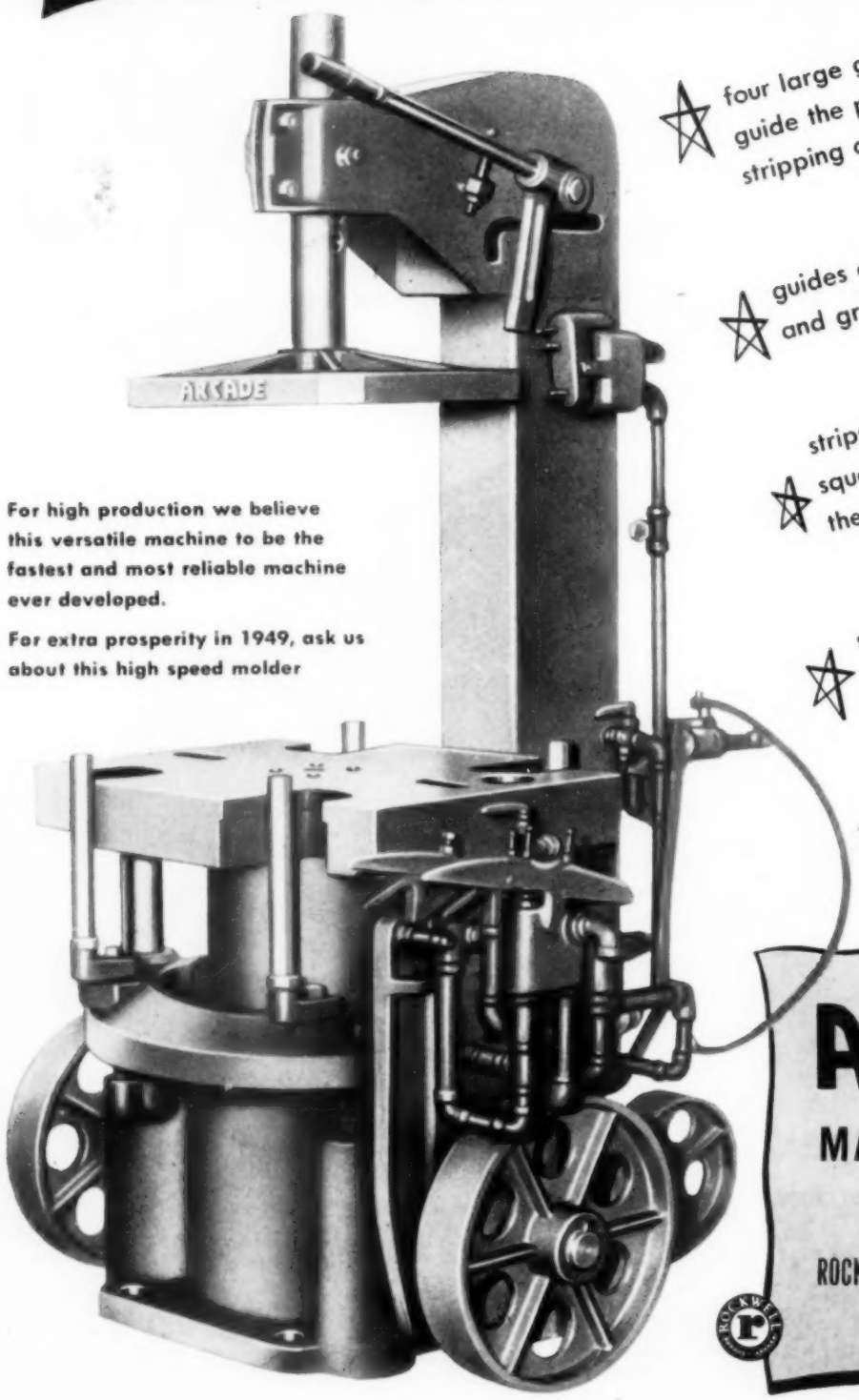
113

FOR HIGH SPEED PRODUCTION AT LOW COST

No. 128 Jolt Squeeze STRIPPER



- four large guide pins to guide the pattern draw or stripping operation
- guides and bushings hardened and ground
- strips on the exhaust stroke of the squeeze or will push off after the squeeze
- serves as a jolt squeeze stripper, a jolt squeeze, pin push off, or as a plain jolt squeezer
- heavy, exceedingly rugged – all sizes

For high production we believe this versatile machine to be the fastest and most reliable machine ever developed.

For extra prosperity in 1949, ask us about this high speed molder

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Nodular Graphite Iron Should Widen Markets

CONSIDERABLE interest has developed during the past year in the production of nodular graphite cast irons through the use of cerium, magnesium, and other metallic elements. Application of cerium to iron has been investigated extensively by the British Cast Iron Research Association, and was described in papers presented before the Philadelphia Convention of the American Foundrymen's Society in May, and the London Conference of the Institute of British Foundrymen in June. Similar research carried on in this country with magnesium also was announced at Philadelphia and considerable work with magnesium and other metallic elements has been undertaken in recent months.

Results thus far announced would seem to indicate that nodular graphite cast irons offer valuable engineering properties in ultimate strength, yield strength, impact resistance, elongation and reduction of area, and modulus of elasticity. It is quite possible that in the years ahead these developments will have significant influences on the techniques employed in the foundry and on the choice of engineering materials by buyers of castings. Gray iron foundrymen rightfully should be enthusiastic over nodular irons, since they appear to provide potentials for the production of high quality components in the as-cast condition.

However, publicity generating from the work on nodular cast iron has become confusing and misleading. The climax was reached recently when a speaker in Cleveland, who is not connected with the industry and evidently is not too familiar with the work on nodular irons, prophesied that these developments would outmode the malleable iron industry. That the steel casting industry also would lose business to the new materials has been hinted.

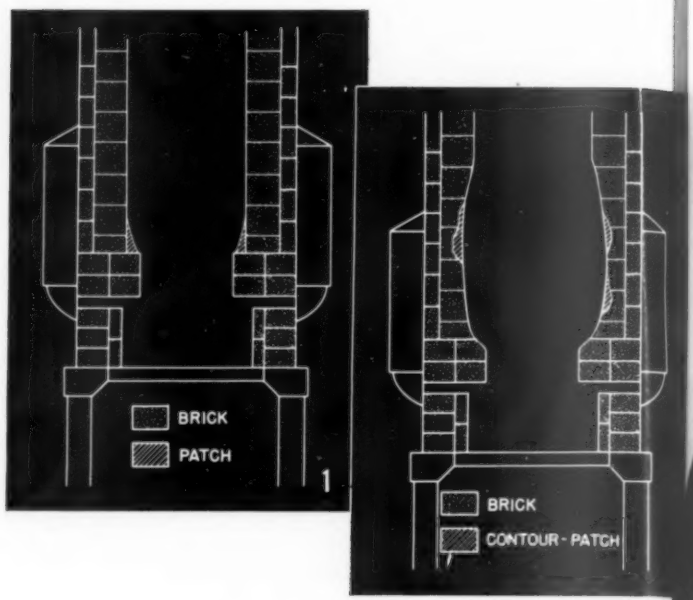
Instead of damaging any particular segments of the foundry industry, it would appear far more probable that the very nature of these developments would widen the markets for component parts produced by the casting process. Various types of foundries may engage in the manufacture of these materials after such problems as production methods and control of mechanical properties have been solved and the transition from laboratory to commercial production under industrial conditions has been accomplished.

Within the past few days, gray iron, malleable iron and steel foundrymen have discussed the possibilities of nodular graphite irons with me. Each expressed the belief that, because of experience, equipment and technical control, his particular type of plant is best suited to produce nodular graphite irons. Time may show that all of these foundry operators are right.

Frank G. Steinebach
Editor

THE FOUNDRY
WHEREVER METALS ARE CAST

Better Patching



Improves cupola operation

ALL foundrymen recognize that cupola patching affects the economy of cupola operation, but some do not allow for the effect on efficiency of operation. Operating difficulties that seemingly are related to coke, pig iron, tuyere ratios, etc., on numerous occasions have been traced to faulty patching technique. It is not safe to take an "out-of-sight, out-of-mind" attitude toward patching and lining a cupola. Patching is vital to the overall operation of the cupola; it is more than a necessary evil.

A cupola can take an unbelievable amount of abuse for short heats, when using ideal materials. However, it is much more difficult to make a cupola "talk" for long heats and with widely fluctuating materials and melting rates. Although even poor cupola operation may result in iron capable of filling a mold, good cupola operation is more economical per pound of good castings. This discussion will assume a desire for good operation and maximum economy.

Most factors of cupola operation are important. However, we feel safe in specifying that the most important single factor is uniformity from heat to heat and during any one heat. Lack of uniformity can overshadow all other factors. That is the key to the effect of patching practice on good cupola operation.

Many cupolas are controlled closely to provide absolute uniformity. Or are they? We carefully maintain uniform metal charges by weight. We control air rates either manually or by precision automatic instruments. We use the same size coke bed and admit the importance of measuring to obtain uniformity. We weigh the flux to make sure that it remains constant. We try to control every known variable, but we still get variations during the heat. In fact the variation is greater than foundrymen realize, except those who check temperature and chemical analysis for every ladle of iron. Why? Because the operation of the cupola is not always uniform on the *inside*, where it counts.

Not many will deny that a 60-inch diameter cupola operates best under conditions that would not be optimum for a 72-inch diameter cupola. The blast rates should be different; the bed heights should be different; the tuyere areas should be different; even the coke and metal charge sizes should be different. If 60-inch and 72-inch cupolas were standing side by side, we would recognize that they were different. But what about the cupola that starts out with a 60-inch diameter in the morning and burns out to 72 inches during the heat? What happens to the "constant" blast rate, "constant" melting rate, "constant" metal charge, etc., if the cupola changes size during the day?

Fig. 5 illustrates the effect upon the height of the coke bed. That is just one factor. Imagine what happens to: (1) The tuyere ratio, (2) The blast concentration (pounds of air per square inch of area), (3) Thickness of the coke split, (4) Thickness of the metal charge, (5) Effective stock height, etc. Is it any wonder that many foundries have cold iron "at 1 p.m. every day" or that carbon and silicon analyses will not stay steady all day?

Cupola operation can be uniform only if everything remains reasonably uniform inside. Theoretically, the operation could (*Please turn to page* 254)

By TOM BARLOW
and E. W. CLAAR
Eastern Clay Products Inc.
Jackson, O.

Fig. 1—Original brick lining prior to service
Fig. 2—Burnout and patch after first short heat
Fig. 3—Burnout and patch after first long heat or second or third short heat

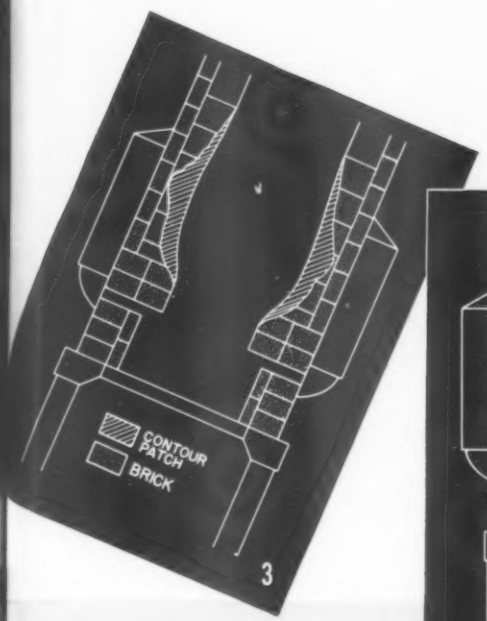
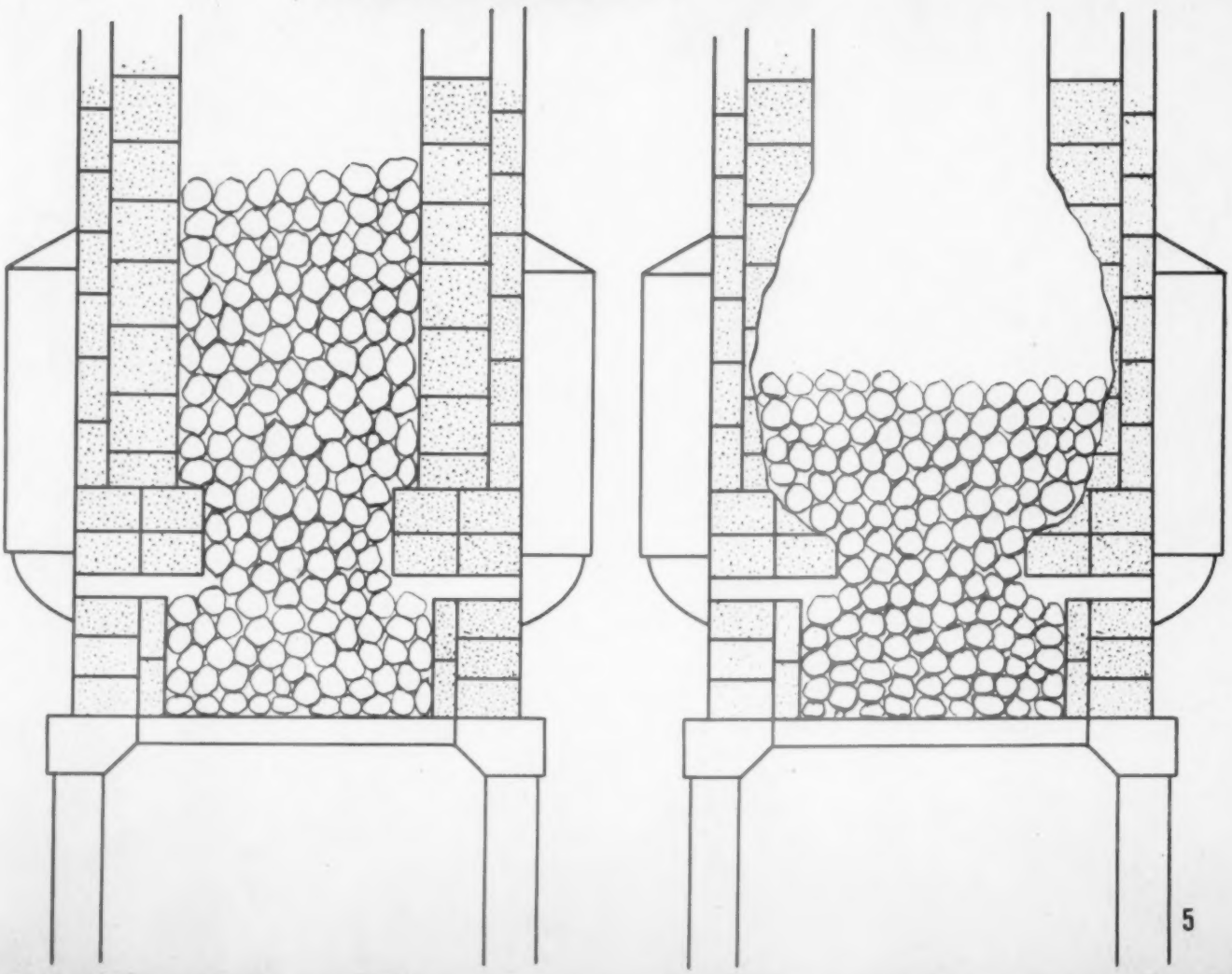


Fig. 4—Contour patch compared with straight patch (not recommended) and boshed-in patch (not recommended)

Fig. 5—Showing effect of excess burn-out on coke bed height. Other factors affected include blast concentration and thickness of coke split and metal charge



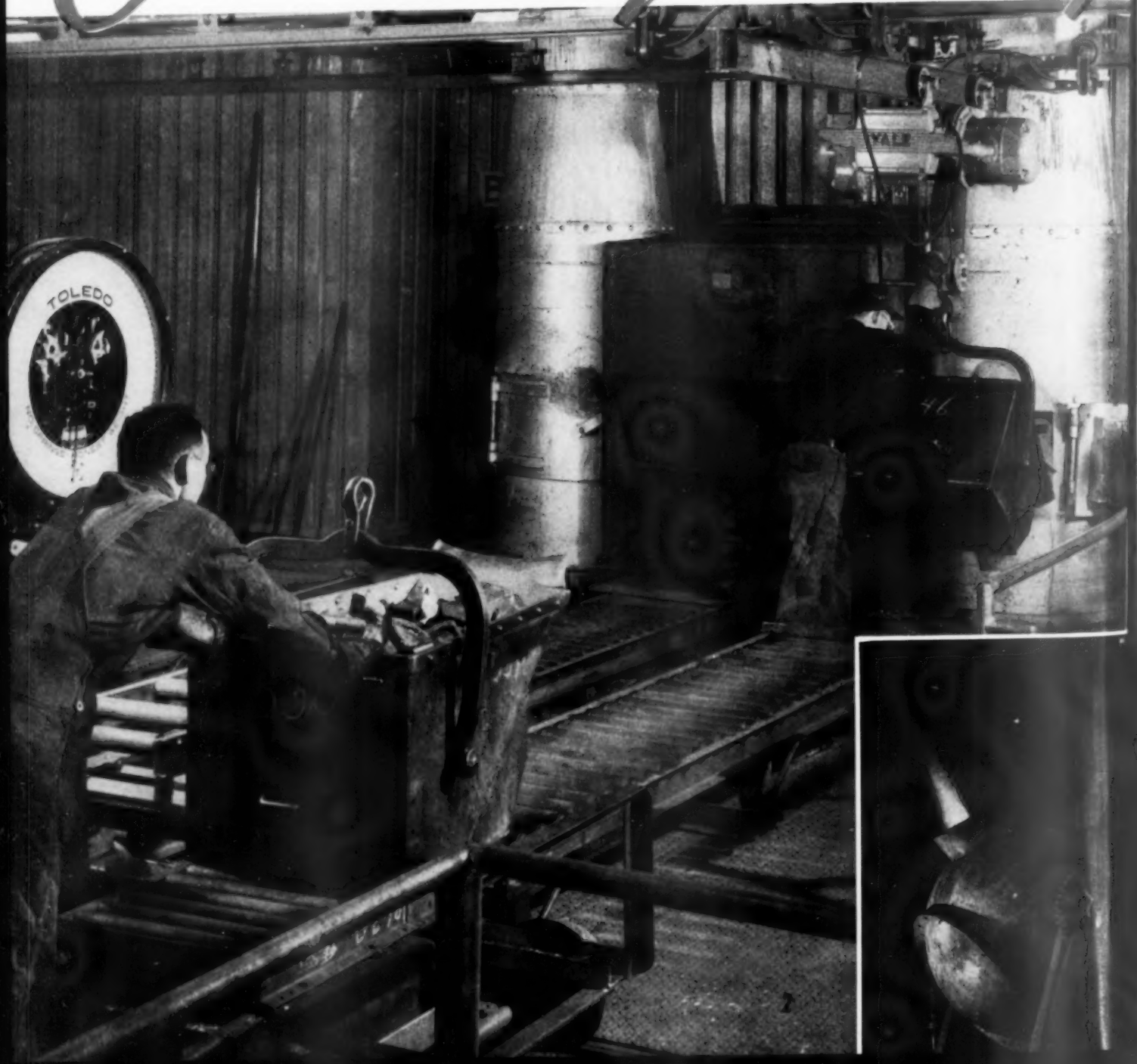
New

Nonferrous

Foundry

Incorporates

Outstanding Working



g Conditions

By WILLIAM G. GUDE
Managing Editor
THE FOUNDRY

AMERICAN Brake Shoe Co. is a strong proponent of the theory that good working conditions and modern foundry facilities will attract a desirable type of employee who will produce a superior quality product. It has followed this theory in designing the six plants it has built since the end of the war, the newest of which is the nonferrous foundry of National Bearing Division at Meadville, Pa.

This foundry replaces four old plants—one in Jersey City, N. J., two in Pittsburgh and one in Meadville—but its capacity greatly exceeds those of the old units combined, and in addition provides complete machining facilities not previously available. Meadville was a logical choice for the new plant because it places the company nearer to users of blast furnace castings, steel mill bearings and industrial nonferrous parts in which the division specializes. National Bearing Division also operates plants in Chicago, Niles, O., Portsmouth, Va., St. Louis and St. Paul. The Niles unit is a new mechanized journal bearing plant which started production in 1947.

The largest foundry to be built since the war for the casting of copper-base alloys, the Meadville plant is an excellent example of the modern trend in design of plant, departmental layout and foundry equipment—a trend which has had such beneficial effect on working conditions. A striking feature of the plant is its large area in relation to number of employees—185,245 square feet of floor space and 450 workers. This floor area includes a two-story office and employee service building; the main foundry building and machine shop measuring 735 x 250 feet, and a heating plant housed in a separate unit. All construction is of brick, concrete and structural steel. Incandescent lighting is used in the foundry, fluorescent lights in the machine shop. The office and employee service building, 200 feet long, houses a fully equipped dispensary; bright and spacious lunch, wash and locker rooms for employees; metallurgical and chemical laboratories; the engineering department, and general offices.

Contributing in large measure to the cleanliness and airiness of the plant is a highly efficient ventilating system. Some sections are provided as many as eight changes of air a minute; others receive a change of air every 10 or 15 minutes, depending on the need. Air is cleaned by a dust collecting system of the wet type, with individual exhausts located at shakeout and casting cleaning stations. Dust-laden air from sand handling equipment and from chipping benches and grinders is collected and exhausted into the outside atmosphere by two wet type collectors having a capacity of 65,000 cfm. This air is not recirculated but is replaced by fresh air. Sludge from the wet collectors is deposited in a floor tank from which it is pumped continuously to an outdoor settling basin.

Fig. 1—Aerial view of new Meadville, Pa., plant of National Bearing Division, American Brake Shoe Co.

Fig. 2—Charging one of the two cupolas. Melting equipment includes 19 various type furnaces for production of approximately 30 different grades of copper-base alloys. Daily melting capacity is 200,000 pounds

Fig. 3—Two oil-fired rotary type furnaces in operation

Fig. 4—Tapping a heat. Hot metal is transported to molds by lift truck

The plant has 20 power ventilators in the roof to remove smoke and gases from melting furnaces, the pouring floor, etc. These ventilators exhaust about 450,000 cubic feet of air per minute. To assist air exhaustion from the melting department fresh air is introduced through floor openings. These have a capacity of 60,000 cfm and not only help to lower the temperature in the department, but also prevent drafts from being created by drawing air from nearby areas. The plant also has 21 unit heaters, 17 of which introduce 20,000 cubic feet of outside air per minute each.

Castings production at the Meadville plant encompasses a wide variety of types of product and metal analyses. The number of different alloys cast totals about 30, with an average of 12 to 16 different grades poured daily. These are cast into such products as bosh plates and tuyeres for blast furnaces; diesel engine bearings, locomotive wearing parts and car bearings; pump impellers and housings; steel mill bearings; gear blanks, and industrial manganese and aluminum bronze structural castings weighing up to 30,000 pounds. Many castings are made only infrequently—which contributes to the fact the pattern storage department contains some 50,000 patterns. The plant's modern pattern shop employs ten patternmakers.

Use Many Types of Furnaces

Flexibility that is necessary in the melting department to accommodate the different grades of alloys cast is provided by a wide range in size of individual furnaces. Total melting capacity of 200,000 pounds a day is furnished by 19 furnaces ranging in size from seven small pit type crucible furnaces handling heats as small as 100 pounds, to a large reverberatory furnace of 20,000 pounds' capacity. The latter, used in the production of the largest castings, is provided with an ingot mold conveyor which permits it also to be used in the refining of metals and pouring of ingots used by the smaller furnaces.

Other melting units include two 22-in. diam cupolas, six direct-fired rotary type furnaces, two tilting type crucible melting furnaces, and one small (3000-lb capacity) tilting reverberatory furnace. The furnaces, other than the cupolas, are both oil and gas fired. The cupolas are used to melt only lead-content alloys because lead absorbed by the refractory wall would tend to contaminate other alloys if melted in these furnaces.

The melting department is partially walled off from other sections of the foundry, as may be seen in Figs. 2, 3 and 4. Furnace charging is handled in an efficient and somewhat unusual manner from a mezzanine in back of the furnace room. All raw materials used in melting are weighed and classified when brought into the plant, and stored in metal tote boxes in an area near the charging platform. As required the boxes are moved by a high lift truck to the charging platform where individual furnace heats are made up in special charging buckets placed on the traveling scale car shown in Fig. 2. The car then is moved along its track to any one of various roller conveyors which lead to the furnaces.

Outstanding Working Conditions

Fig. 2 illustrates the cupola charging operation in which the charging bucket is picked off the roller conveyor by a monorail hoist and emptied through the charging door. The coke bin between the two cupolas holds a day's supply of fuel and is raised to the charging floor by lift truck and slid into position over the roller conveyor. Other furnaces are charged from this floor in a similar manner, except that raw materials are delivered to them via gravity chutes leading directly to each unit. This arrangement permits prompt recharging after the furnaces are tapped. In addition to saving time it prevents any interference between hot metal handling and raw material movement on the furnace room floor.

The molding department employs a variety of equipment to accommodate a wide range in size of individual molds. A motive type sandslinger is used for making medium and large size molds in the floor molding section which produces both green and dry sand molds. Molds to be dried are handled by a large oven taking molds up to 14 x 16 ft and 12 ft high. For the largest work a molding pit measuring 10 x 15 x 20 ft is available.

For floor molding done on machines the equipment includes one jolt rockover unit, two jolt-squeeze rollover draw machines, three jolt-squeeze strip and three jolt-squeeze machines, with a total capacity of about 1200 molds a day. The floor molding section is served by a 10-ton and a 5-ton overhead crane.

Completed molds are carried from the machines by roller conveyor to the pouring area. Hot metal

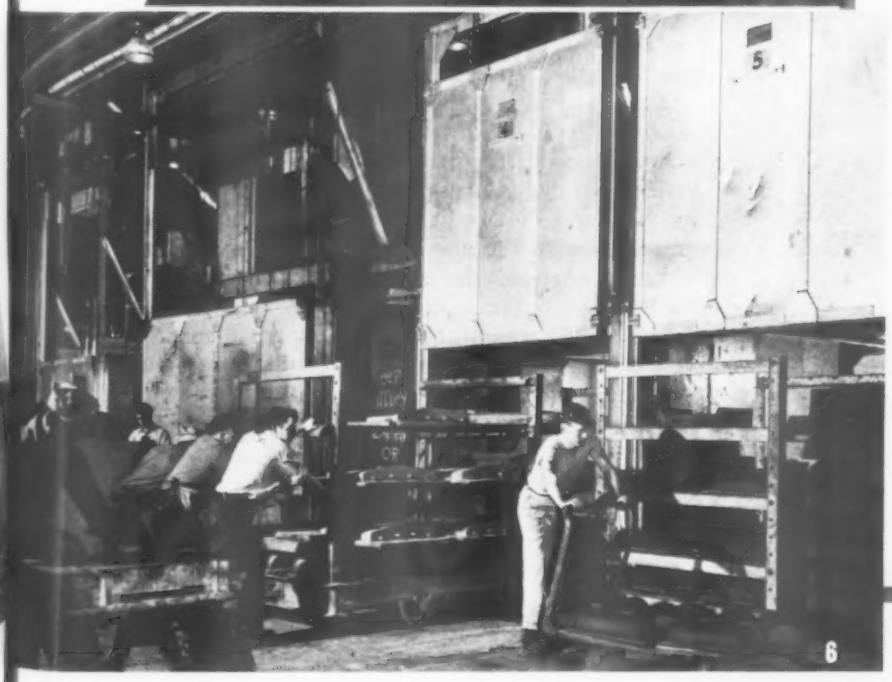


Fig. 5—Lowering a core into a mold for casting a blast furnace bosh plate. The arrangement permits pouring the casting while the mold is vertical

Fig. 6—Core baking equipment includes four rack type ovens and the car type oven shown here

Fig. 7—One of the pouring lines. Roller conveyors lead from molding stations to shakeout

Fig. 8—Larger and more intricate castings are blasted in this room
Fig. 9—Pouring phosphor copper is controlled automatically from panel at left. Effective hooding prevents dissipation of fumes

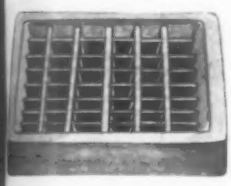
is brought here by lift trucks having forks equipped to hold the tapping ladle, as shown in Fig. 4. This ladle then is transferred to a hoist on the pouring floor (Fig. 7). Recording pyrometers are used to check pouring temperatures.

Poured molds proceed by gravity to two shakeouts at the end of the lines, where they are shaken out mechanically. A special device employed here eliminates much of the arduous work often associated with the shakeout department. This consists of a grab which, upon the operation of a control, automatically picks up the mold, moves it into the hooded shakeout and deposits it on the vibrating screen, then returns the empty flask after sand and castings have dropped out. A change of air once each minute makes for unusually clean conditions in this area.

Other molding facilities include a bench molding floor equipped with ten jolt-squeeze machines. Shakeout of castings produced in this department is handled by specially designed power trucks which remove molds to three screens in the floor through which the sand is returned to the central system.

Fig. 10—Individually exhausted booths are provided for chipping castings in the cleaning department

Outstanding Working Conditions



Sand conditioning equipment is located in the center of the foundry and has a capacity of 20 tons per hour. It includes three mixers, storage tanks and screens, together with continuous belt conveyors for delivering prepared sand to molding stations and the sand slinger, and for returning used sand from the shakeouts. Return sand moves underground to an elevator which delivers it to the conditioning unit. Regular tests are conducted on sand mixtures, which are controlled closely to maintain uniformity.

A sizable number of cores are required daily, and many of these are large cores, such as those shown in Fig. 6 and in the close-up view (Fig. 5) of a core for a blast furnace bosh plate. The latter illustration shows how the flask is arranged for casting this part so that the mold is vertical during pouring. Principal coremaking equipment includes a jolt roll-over draw machine, two jolt-squeeze machines and three core blowers. Sand is prepared in two mechanical mixers, and core baking is handled by four rack type ovens and one car type unit, all electronically controlled.

The finishing department is laid out so that castings move on practically a production line schedule from rough inspection, chipping and cleaning, through to grinding and tumbling, welding and heat treating (where necessary), and finally to physical testing and final inspection. Chipping is done in individually exhausted booths, such as shown in Fig. 10, and a dust arrestor system also is provided the grinding station. Larger and more intricate castings are cleaned in a hydroblast room; Fig. 8 shows the cleaning of bosh plates in this room. The final inspection department and shipping platform are so arranged that castings can be loaded at platform level directly on freight cars or on trucks. A spur railroad line runs adjacent to the building.

Special precautions against fumes are taken in a separate department where phosphor copper is produced in both waffle and shot form. This alloy is used as a deoxidizing agent and hardening element in the foundry. The phosphorus itself is received in drums which are stored under water in a large pool until used. Because of the phosphorus pentoxide fumes produced when phosphorus is introduced into copper, the six crucible furnaces in which the metal is melted are effectively hooded. The pouring station at which the phosphor copper is poured into metal molds also is hooded, and all fumes drawn off are collected by electrical precipitation and turned into phosphoric acid. The precipitation unit is housed in a separate structure near the main foundry building.

Automatic Pouring Device Fills Molds

As indicated in Fig. 9, operators pouring phosphor copper into molds are further protected by an automatic pouring device controlled by a push-button panel some distance from the crucible. Poured molds on the merry-go-round enter a tunnel, and by the time the last mold is poured the first one will have cooled sufficiently to be removed.

All skimmings from ladles and slag from the furnaces are processed in the plant's reclamation unit. These materials are crushed in a mechanical crusher, classified according to size, and then processed by jigging so that all metal is separated from the slag. Reclaimed metal is melted down and the ingot analyzed for reuse in the furnaces.

Provisions have been made in the plant for a centrifugal casting department which will start operations shortly. It will have both vertical and horizontal machines for the production of such castings as bushings, gear blanks, etc., up to 40 in. in diameter and 18 in. long.

The modern machine shop at the Meadville plant covers 36,400 sq ft of floor space and is equipped with 97 machine tools. In addition to various types of machining, the shop also handles electroplating and babbitt lining of bearings.

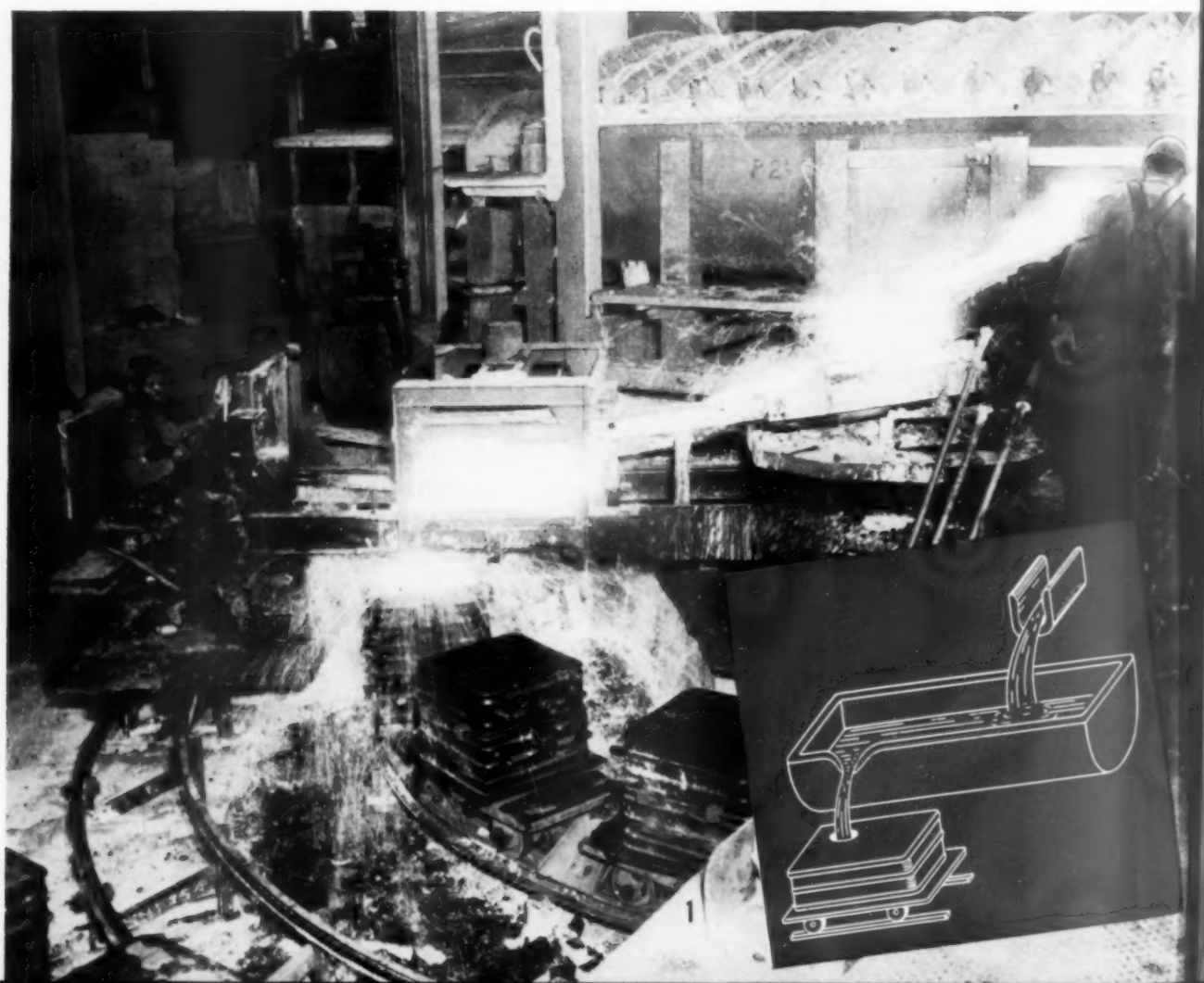
Both chemical and physical laboratories are available for testing and analyzing raw and finished materials. Complete check analyses are made of all raw materials prior to their use. The chemical laboratory is equipped with various instruments for electro-chemical analyses, spectro-photocolorimetry, etc., while the physical laboratory facilities handle testing of mechanical properties.

Malleable Iron Foundry

Brought up t

ABOUT four years ago the management of the Indianapolis, Ind., plant, National Malleable & Steel Castings Co., began a careful survey of various developments in foundry methods and equipment which could be applied to mechanization of its long established foundry. After visiting many newly constructed foundries and others which had been modernized, and consulting with equipment manufacturers, a foundry layout was designed to incorporate the most efficient use of mechanized equipment for the production of malleable iron castings.

Since it was desired to place the modernization program into effect with the least disturbance of production, many complications ensued which were overcome by shifting molding facilities from one location to another as work progressed. First step in the program was the erection of a new foundry building 140 ft wide and 235 ft long, extending largely over an already existing structure in daily use for molding of castings. As soon as that was completed, the old structure was removed piecemeal and the molding floors shifted around to permit the installation of five conveyor type molding lines, a sand han-



dling system, two 25-ton-an-hour capacity cupolas with charging equipment, two 20-ton capacity air furnaces, and a connecting waste-heat boiler.

At the same time the modernization of the melting and molding departments was being carried on, the cleaning, finishing and annealing departments were being rejuvenated. This was necessary because the facilities, while satisfactory for handling the quantity of castings produced by procedures formerly in use, hardly would begin to cope with the forthcoming veritable flood of castings resulting from the new installations. Hence, to eliminate any possibility of a bottleneck both construction projects were undertaken simultaneously so that there would be no hindrances to a steady flow of castings to the shipping department. As in the case of molding and melting, cleaning and finishing operations were shifted around to permit production to continue.

Installations in the trimming department include a twin vibrating screen shakeout unit, a circular conveyor on which gates and risers are separated from the castings, and an overhead trolley conveyor system for transporting castings to the annealing department and gates and risers to the melting department. Nineteen gas-fired radiant tube furnaces were placed in the annealing department, while in the finishing department elevated bins, arranged in a rectangle, were constructed to hold the castings prior to grinding; the grinding machines being located on the periphery of the bin arrangement. An overhead trolley conveyor for transporting castings from the annealing department to the grinding department also was installed as well as abrasive blast tumbling equipment.

As previously mentioned, melting now is accomplished in cupolas, and refined and superheated in air furnaces. Two cupolas lined to 60 in. inside diameter are used on alternate days for supplying hot metal to either of two powdered-coal-fired air furnaces which operate on a five-day schedule and then are repaired. Air furnaces are arranged end to end, and between them is located a 300-hp waste-heat boiler instead of a stack or chimney. Combustion gases from the furnace in operation pass through the waste-heat boiler and preheat air to 600° F for the cupola and to 300° F for the powdered fuel burners of the air furnace, as well as supplying sufficient steam for operation of air compressors and heating the plant in the winter.

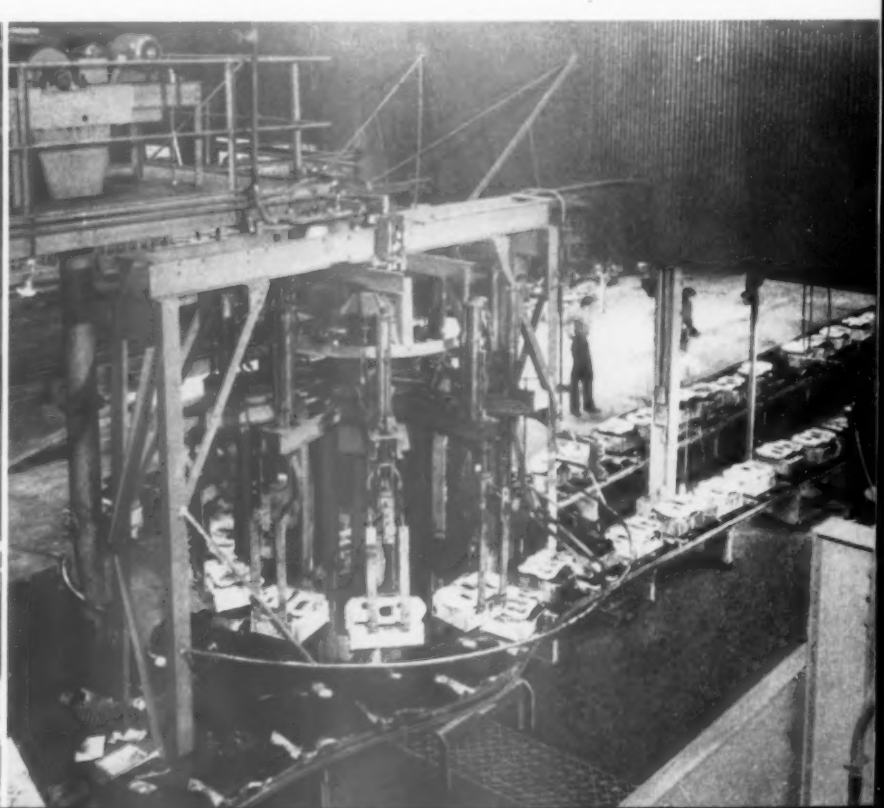
Raw metallic materials are stored in bins in the yard, which is served by a 7½-ton crane with a 65-ft span on a 100-ft runway. Coke and limestone are kept in elevated bins just outside the building wall. These bins discharge into a weigh larry, and thence into the charging buckets on top of the metallic charge. Metals are picked up by a magnet and dropped into a weighing hopper with a dial clearly visible to the crane operator. When the proper weights of the various metals are assembled in the hopper, the load is discharged into a bottom-dump cylindrical charging bucket which is elevated to the cupola by a skip-hoist.

to date

Fig. 1—Pouring machine handling molten metal from air furnace to molds on car type conveyor at Indianapolis plant of National Malleable & Steel Castings Co. Sketch shows continuous tapping method

Fig. 2—Automatic shakeout removes flasks from conveyor, traverses to shakeout hopper, vibrates sand and castings from flask and returns empty flask

Fig. 3—Automatic weight and jacket shifter for snap flask molds. Machine is built into, synchronized with and operated from car type mold conveyor



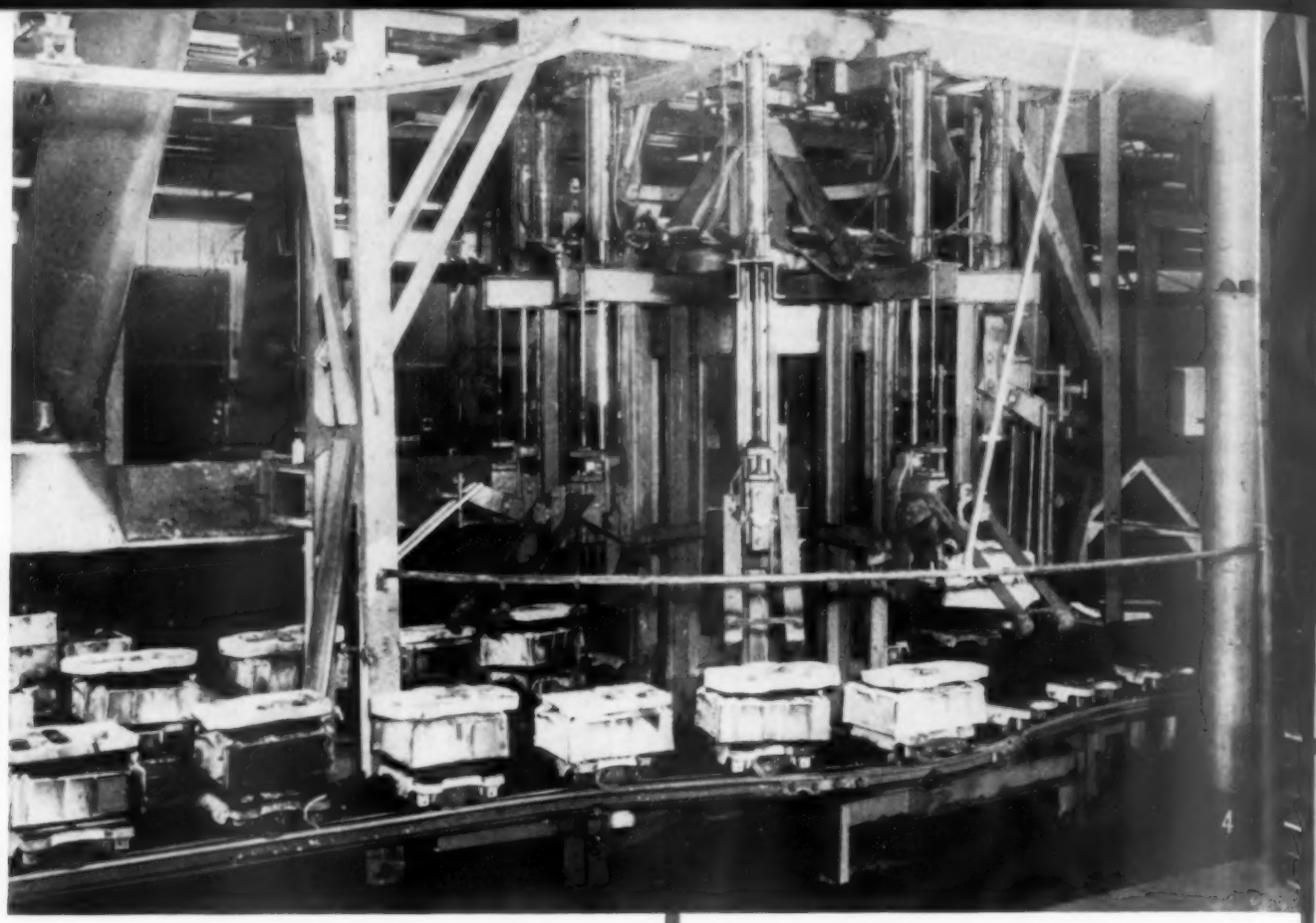


Fig. 4—Another view of the automatic weight and jacket shifter for snap flask molds. Weights and jackets are automatically placed on molds before they enter pouring zone and removed after molds return from pouring zone

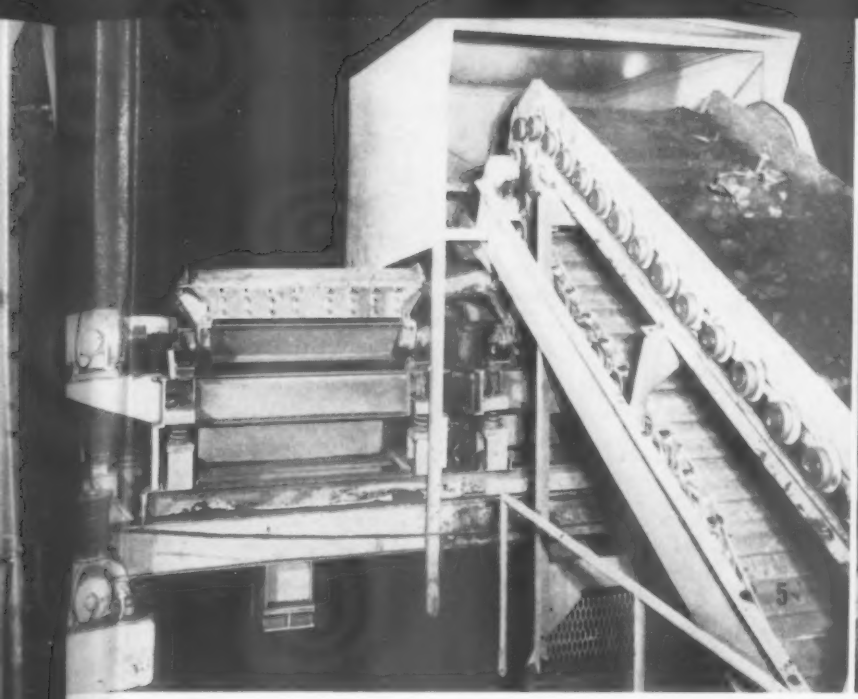
Present melting rate of the cupolas is about 22 tons per hour with charges averaging about 4000 lb.

As may be observed in Fig. 1 the exterior of the air furnace is a rectangular steel shell in which the lining is placed. The furnace is supported about 6 ft above the floor on structural steel members which permits air cooling of the bottom and extends the life of the furnace bottom refractories to an appreciable degree. Molten metal from the furnace flows continuously into a spout about 5 ft long parallel to the furnace. An axis at the center of the spout permits tilting so that the metal will flow to the left or to the right. On each furnace when the spout is tilted the molten metal flows into 300-lb pouring ladles suspended from a monorail system. The metal is transported in the ladle to one of the snap flask conveyor lines. When tilted in opposite direction the spout delivers the metal into an ingenious pouring machine for tight-flask work.

The pouring machine, used to pour molds on the tight-flask conveyor line as shown in Fig. 1, consists of the operator's car or platform at the extreme left which rides on a semicircular track. The platform is attached to the pivoting point close to the furnace by horizontal steel members which serve to support the launder or trough for the molten metal, and the pouring ladle mounted in the framework just in front of the operator's platform. Platform swings in a circular arc of about 60 degrees, the movement being controlled by an electric foot-switch. Speed of movement is synchronized with that of the conveyor line. Limit switches prevent the platform from moving too far to either the right or to the left.

Tilting of the pouring ladle is controlled manually by the operator, who is protected from any flying metal particles by a heavy plateglass screen about 3 x 4 ft. The pouring ladle is mounted so that it may be moved back and forth to center the lip over the sprue opening.

Molding is conducted on five conveyor lines. Four of the lines are car-type, chain operated, while the fifth is a gravity-roller conveyor. Tight-flask conveyor line has a capacity of 200 molds per hour, and is 625 ft long. It is L-shape with the short leg travelling parallel to the air furnaces. Trays on conveyor are 22 x 38 in. located on 50-in. centers. To prevent contamination of the atmosphere with steam and other gases, the section extending from just after the pouring station to the flask shakeout is hooded and connected with an exhaust system. An automatic flask shakeout, shown in Fig. 2, is located near the end of the conveyor line opposite the pouring station. This consists of a mechanism which picks up the clamped cope and drag flasks from the car, moves them over a discharge opening in the floor, vibrates the flasks so that sand and castings drop out, and then returns the flasks to the conveyor car. Flask shakeout machine is synchronized with and operated from the conveyor. Drag molds on the line are made on jolt rollover molding machines and the copes on squeeze type machines.



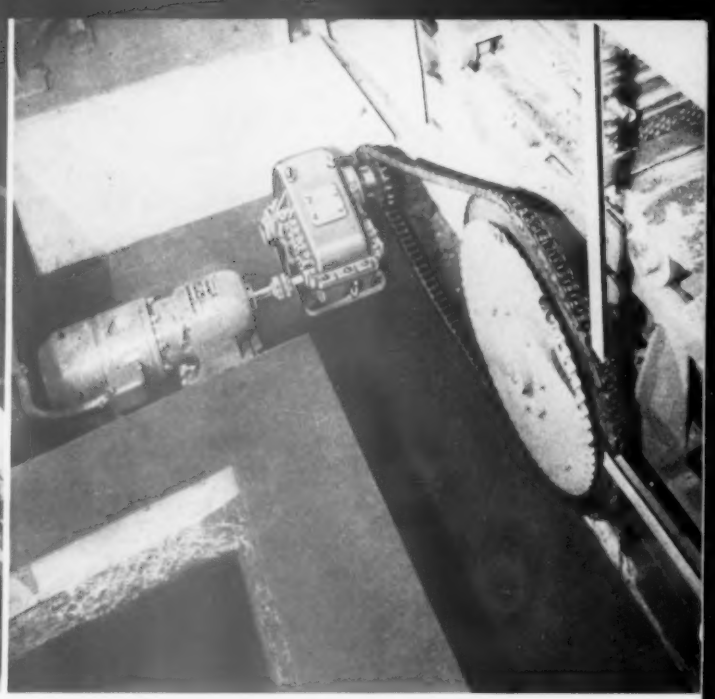


Fig. 5—Apron conveyor and dual shakeout screen installation. Push-button control operates car spotter which moves stand-by screen into operating position for servicing the other screen

Fig. 6—Drive for continuous car type mold conveyor. Double sprockets provide selection of two speeds for mold conveyor

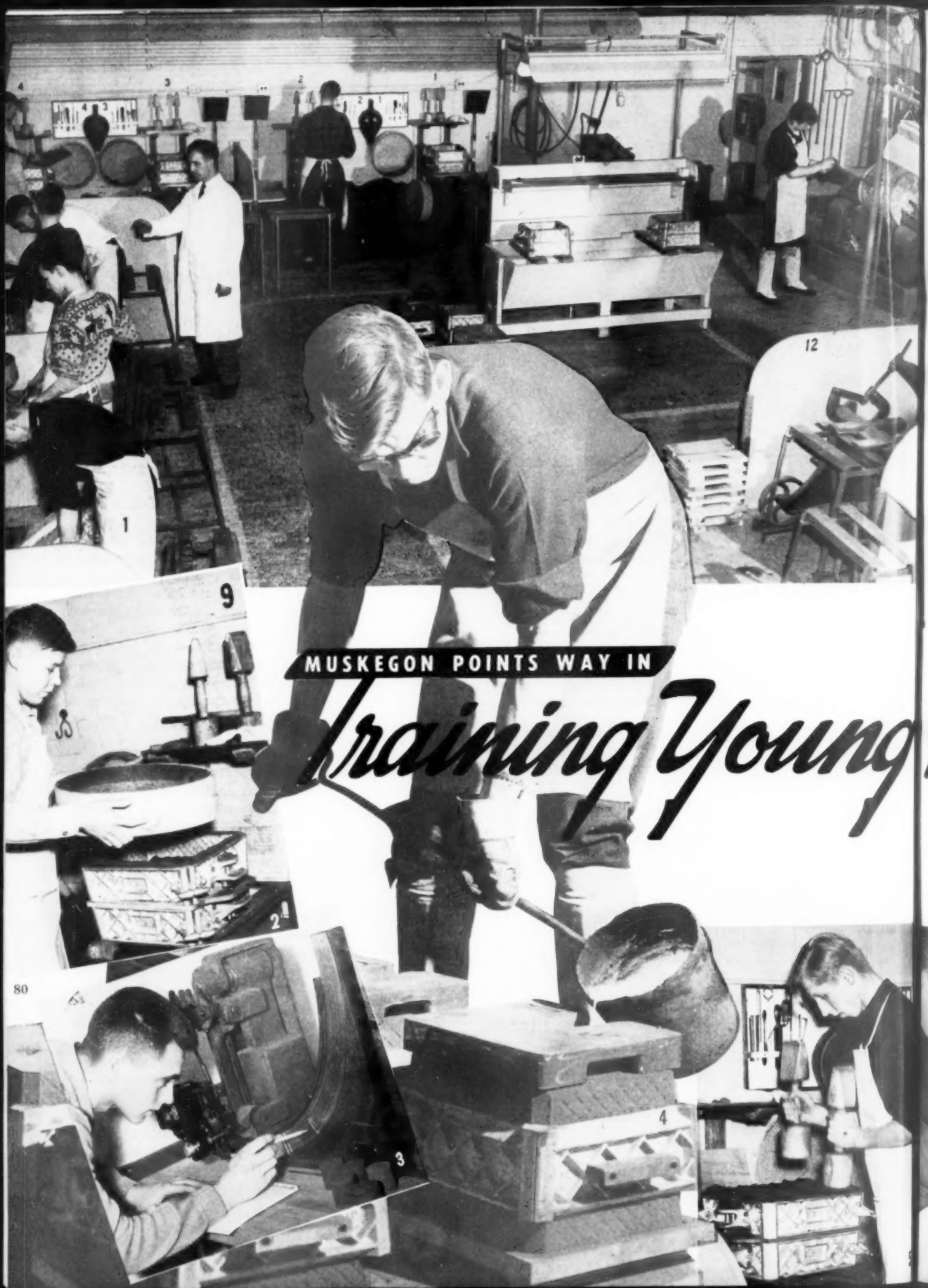
The three snap flask conveyor lines, identical in construction, are 300 ft long, and the 15 x 17-in. cars are spaced on 30-in. centers. Tops are hinged on one side with an arm and roller on the other. This arrangement permits the top to be tilted when the arm rides up over a cam rail at the mold dump or shakeout, permitting the mold and its contents to slide into a discharge chute. An innovation on these lines is the incorporation of automatic weight and jacket shifters, shown in Figs. 3 and 4. These consist of ten vertically mounted clamping devices which raise the weights and flasks from the molds that have been poured and transfer them to the unjacketed molds on the opposite side of the conveyor line. Movement of the shifters is synchronized with and operated from the mold conveyor line. Molds on each of the snap flask lines are produced on jolt-squeeze type machines. These lines also are hooded from pouring station to the jacket shifting units.

As an additional means of maintaining a clean atmosphere in the molding department, the melting and pouring sections are separated from the remainder by a corrugated steel curtain which extends from the roof to within 12 ft of the floor.

Sand and castings from all the mold conveyor lines are discharged onto an oscillating conveyor beneath the floor. It is at right angle to the mold lines and carries sand and castings to an apron conveyor which elevates them through the wall to an adjoining building where they are discharged to one unit of a twin vibrating screen shakeout. The installation is mounted on rails, as shown in Fig. 5, so that either may be moved in and out of position when repairs or servicing are required. Sand falls through the screen onto an oscillating conveyor which transports it to a belt, which in turn elevates the sand across the building to two 100-ton storage bins. From storage the sand is discharged continuously into pug mills where it is reconditioned for use by additions of seacoal, bond and moisture. From the pug mills the sand is elevated by belt to the several distributing belts over the hoppers located along the molding lines.

Castings from the shakeout screen drop onto a circular flat top conveyor 98 ft in diameter which rotates at the rate of 3 ft per minute in a clockwise direction. A few feet from the shakeout the castings pass through a stress relieving furnace 42 ft long. Only the first 30 ft of the furnace contains burners, which raise the temperature of the castings to 1100° F. From the furnace the castings pass through a covered cooling zone about 60 ft long where the temperature of the castings is reduced so that they may be handled without difficulty. Cooling zone is attached to an exhaust system which pulls through 40,000 cu ft of air per minute. Additionally a fan induces 10,000 cu ft of air per minute into the cooling zone.

The next 30 ft of the circular conveyor beyond the cooling zone is devoted to breaking off gates and risers from the tight-flask or heavy castings, and the remainder to similar work on the snap flask castings. Operators on the inside and outside of the conveyor break off the gates and risers, place the castings in rectangular steel buckets holding 500 lb, and leave the gates and risers on the conveyor. Gates and risers are carried around until they reach a point near the shakeout discharge. There they are removed automatically by (*Please turn to page* 198)


MUSKEGON POINTS WAY IN
Training Young

Foundrymen of Muskegon, Mich., have demonstrated that co-operation between private industry and the public school system can create the desired type of training facilities. How it was accomplished is told here

Foundrymen

By WILLIAM G. GUDE
Managing Editor
THE FOUNDRY

THE city of Muskegon, Mich., today has what may well prove to be a model for a type of educational program which would be invaluable on a nation-wide scale in attracting youths to a career in the foundry industry.

On Feb. 15 the city's Board of Education formally accepted from a Donors Committee representing over fifty western Michigan companies engaged in the foundry and related industries, a completely rehabilitated foundry which will permit comprehensive training in the art and science of casting metals.

While the project will be of direct benefit to Muskegon district foundries in providing a source of trained employees, other considerations also motivated the plan. George W. Cannon, chairman of the Donors Group, has described the overall objective of his committee as follows: "To encourage the mechanically minded youth of Muskegon to learn to do some one thing well so that they might best serve their fellow men and pass on what they have learned to posterity." Moreover, the area's foundry leaders see in the Muskegon plan a blueprint which can serve to inspire its duplication in other industrial centers of the country.

It should be pointed out that the new program at Muskegon's Hackley Manual Training High School, where the rehabilitated foundry is located, goes beyond the usual trade school training. The school is believed to be the only one of its kind in the country offering a balanced curriculum of academic and vocational training encompassing a highly developed course of study and the most modern equipment in its foundry division. Its students will be expected to learn not only the "how" of foundry practice, but also the "why." They will acquire a basic knowledge of the economics of American business enterprise and become acquainted with the various costs entering into the production of castings.

The unusually complete and extremely attractive training foundry which has been provided would delight the eye of any foundryman; its facilities can hardly help but interest many boys seeking a fascinating career.

Hackley Manual Training School is one of the Muskegon institutions erected through the gifts of Charles H. Hackley, whose public benefactions represented a total of about $6 million between 1888 and 1911. The school now accommodates 2500 students daily in teaching industrial arts and homemaking as well as academic courses. Crafts included in the

Fig. 1—View of the foundry section at Hackley Manual Training School

Fig. 2 — Dave Dobberstein riddles sand preparatory to ramming a mold

Fig. 3—Testing sand in laboratory. Carl Burgess operating tensile machine

Fig. 4—Ellery Olds pouring molds which have been prepared by the class

Fig. 5—Helge Bostrom Jr. is shown here ramming a drag

Fig. 6—In a further step in the molding operation, Tom Marine is removing the pattern from the drag section of the mold

Fig. 7—Raw materials for the furnace are stored in these stock bins

Fig. 8—Dwight Erickson pours gray iron from the electric furnace into ladle held by Ellery Olds. Supervising is A. J. Archambault

Fig. 9—Carl Burgess preparing to clean casting. Side of blast cabinet was removed for this view

Fig. 10—Mr. Archambault inspects mold while the class looks on. Each mold is checked with hardness tester before removing to pouring floor

Fig. 11 — Lowell Decker removes cope section of the mold from the pattern

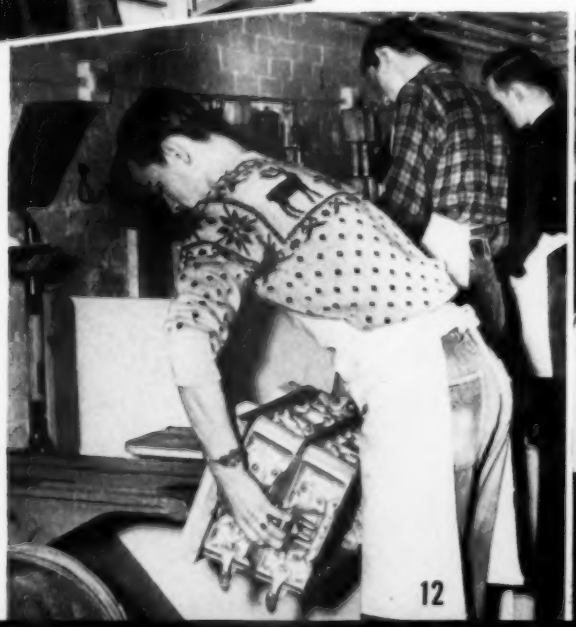
Fig. 12 — Chuck Morse rolls over a rammed drag

Fig. 13 — Molding sand is prepared in this portable mixer. Completing a batch are Ronald Weeks (left) and Gerald Smith

curriculum are patternmaking, drafting, foundry work, machine shop, printing, sheet metal work, electric work, welding, automotive construction and repair, domestic science and band music.

Prior to the rehabilitation program the foundry pre-employment educational course at the school had not been offered for 18 years. The foundry equipment, which had been gathering dust for nearly two decades, included a small cupola, a pair of molding benches, a small tumbling barrel and a grinder—hardly adequate for training in modern foundry practice.

Rehabilitation of the school foundry grew out of a survey which revealed that 22 per cent of the gainfully employed persons in Muskegon were on the payrolls of foundries or allied enterprises; yet there was no training available (*Please turn to page* 118)



In this second and concluding article the author describes operating practice with the acid-lined electric arc furnace. The first article, presented in the February issue, discussed operations of the basic-lined furnace

Steelmaking IN A BRITISH FOUNDRY

By NORMAN F. DUFTY
Sheffield, England

Tapping 5-ton electric arc furnace at K. & L. Steelfounders & Engineers

THE acid furnace charging is completed and melting commences in much the same way as on the basic furnace (as described in last month's issue). Being a lower powered furnace the melting voltage is only 160 and two hours usually elapse before any attempt can be made to get a fracture sample. Additions during the melt are based more on slag condition than bath carbon, though the two are inevitably related. If the slag is thick and shows a green fracture of any shade, indicating a low iron oxide content, the residual silicon will be high. Provided there appears to be more than 0.35 per cent carbon in the bath, 100-200 pounds of ore are added. If the carbon seems to be low, 200-500 pounds of hematite iron are added before using any ore.

A black slag with an iron oxide content of up to 40 per cent shows that the silicon and manganese are already being oxidized and there is no need to add any ore. A soft melt under these circumstances necessitates an even greater iron addition. A slag of this type will attack the silicon and manganese in the bath and the slag line of the furnace. Iron oxide additions will only accentuate the slag line erosion no matter how high the carbon in the bath. Once the silicon and manganese have been oxidized the free iron oxide in the slag will attack the silica of the banks as the bath temperature at this stage will not be high enough to support anything more than a slight carbon boil.

Serious bottom damage during the melt may be caused by the charge scaffolding and consequent overheating of the pools of metal formed under each electrode because they are not frequently chilled off by falls of scrap. A heavy slag will form, usually low in iron oxide, and this must be removed as soon as possible. Attempts to flux it with iron oxide will result in an excessive slag bulk which, due to the high resistance of acid slags, will give rise to unsatisfactory electrical conditions, electrode dipping, etc.

As soon as the bath is clear melted a sample is sent to the laboratory for complete analysis.

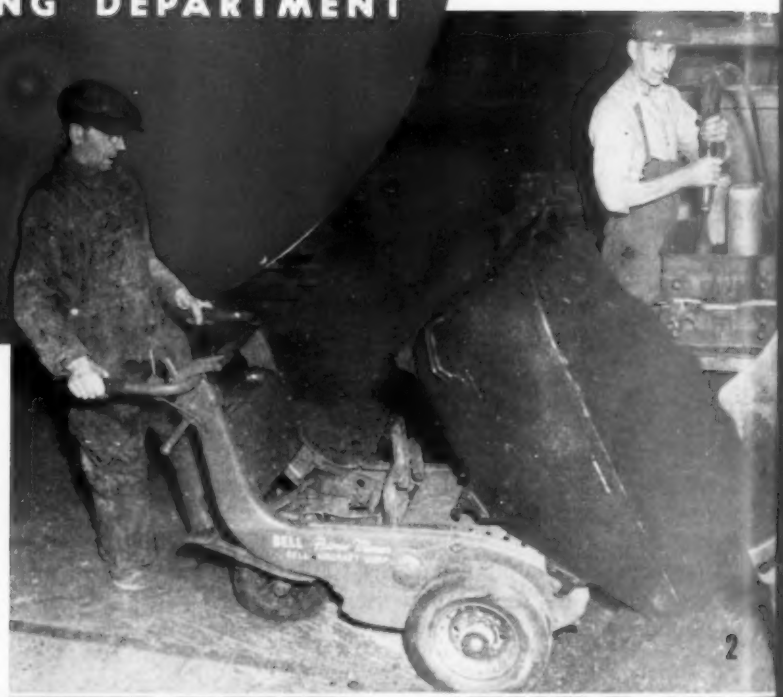
Oxidizing—If the slag is black and high in iron oxide, no ore additions should be made until the bath comes on the boil. Lack of action usually indicates that silicon and manganese are still being oxidized and that the temperature is under 2900° F. If iron ore is added at this stage, the rate of oxidation of these elements will only be increased slightly because, as there is no boiling action on the bath, transfer of iron oxide from the main slag layer to the slag-metal interface is entirely dependent on diffusion. Reaction between the iron oxide in the slag and the silicon in the bath results in a low iron oxide layer overlying the metal. In the absence of a boil, iron oxide replenishment of this region from the high iron oxide layer above it depends on diffusion alone. As this is comparatively slow, the result is an upper high iron oxide layer which is unable to react with the silicon and manganese (*Please turn to Page* 248)

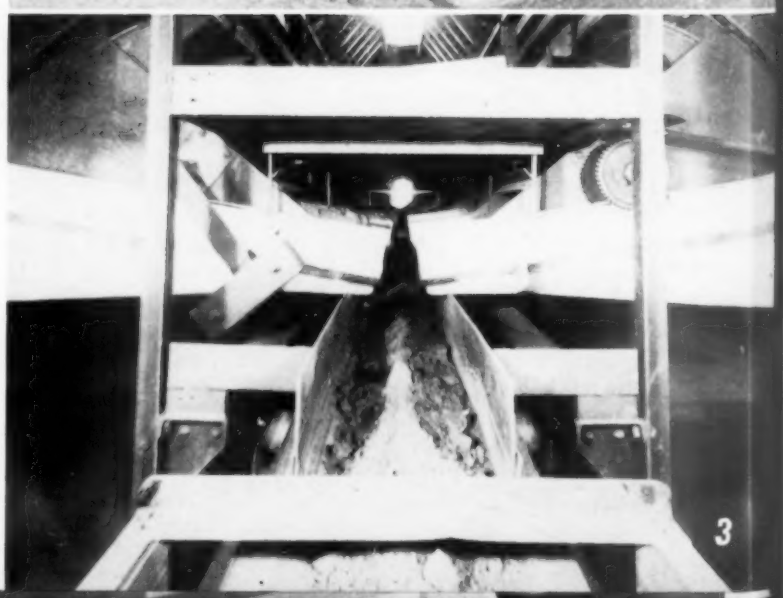
Materials handling equipment used in the molding department is discussed in this third of a series of articles dealing with movement of materials in foundry operations. Previous articles dealt with equipment used in handling materials in the foundry yard and in furnace charging

Handling Materials

IN THE MOLDING DEPARTMENT

By ROBERT H. HERRMANN
Associate Editor
THE FOUNDRY





Fib. 1—Dump-type truck, carrying load of sand

Fig. 2—Motorized wheelbarrow delivers sand to molders

Fig. 3—Vibrating feeder discharges sand from hoppers to belt conveyor

Fig. 4—Vee plows scrape sand from conveyor belt into molders' hoppers

Fig. 5—Inclined belt conveyor carries prepared sand to molders' hoppers

Fig. 6—Close-up view of loose, bulk material elevator

EQUIPMENT for handling foundry materials is not a luxury item; it is an important cog in the machinery of volume production so necessary in meeting the competitive demand for more and better castings. Its importance comes from the fact that it keeps the materials of production moving, keeps them turning over, and therein lies the story of profits. Furthermore, it permits savings in time and labor which are important not only from the standpoint of cost but also from the standpoint of worker morale.

Waiting time has a bad effect on the morale of conscientious workers, particularly those who are working on a piece-work basis. They lose incentive if the delays are frequent and long. On the other hand, such delays are a source of excuses for non-conscientious workers, often leading to industrial disputes and establishment of uneconomic production standards.

Intelligent and efficient use of equipment for moving materials helps to eliminate the waiting by keeping material flow smooth and continuous. This permits the utilization of skilled labor to best advantage. In the molding department, for instance, molders are highly skilled workmen. They should not be kept waiting for tools and materials. Nor should they devote any more than a minimum amount of time or effort to carrying flasks, patterns, gaggers, sand or other materials of their trade. This work should be done by mechanical equipment supplemented, when necessary, by unskilled labor, with materials delivered to molders at the correct time and place. Relieving the skilled men of the burdens of unskilled activity leads not only to greater production and better morale but serves to raise their status and make the trade more attractive to new workers.

This article describes some of the equipment that helps relieve molders of much of the heavier and time-consuming work involved in the making of molds and permits them to devote a greater percentage of time in utilizing their specialized skill in mold making.

Opportunity for extensive use of handling equipment is presented in the movement of molding sand. Fig. 3 illustrates one method of bringing molding sand from hoppers to preparation units prior to delivery to molders. In this installation sand is fed to a

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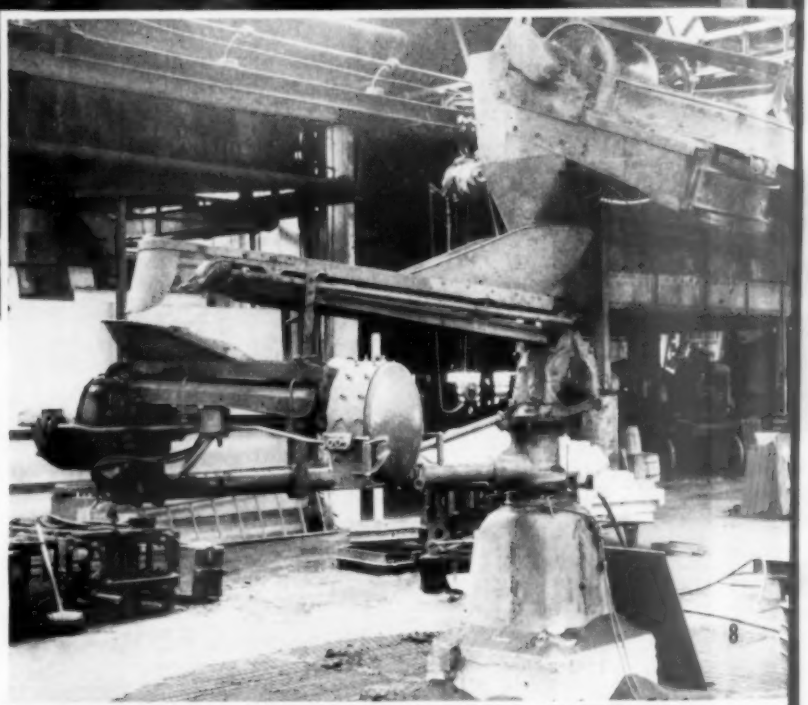


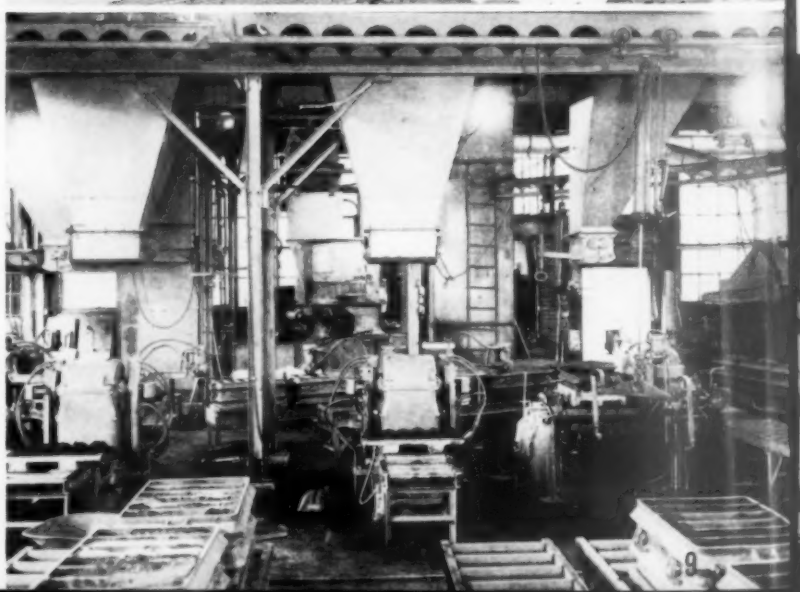


Fig. 7—Scraper conveyor pushes sand along a trough. Sliding gates over molders' hopper may be opened to permit sand to fall through

Fig. 8—Magnetic pulley removes tramp iron from sand being fed to sandslinger

Fig. 9—Gravity conveyors in foreground carry molds away from molding machines to be poured. Power conveyor at extreme right transports poured molds to shakeout. Gravity conveyor in background returns flasks to molding machines

Fig. 10—Newly installed sand handling and distributing system

Fig. 11—Single line hook-on bucket moves sand to large mold

Fig. 12—Vibrating feeder is used to fill flask

Fig. 13—Truck with scoop attachment transports used molding sand to reclaiming units

Fig. 14—Large molds are assembled on gravity conveyors

Handling Materials

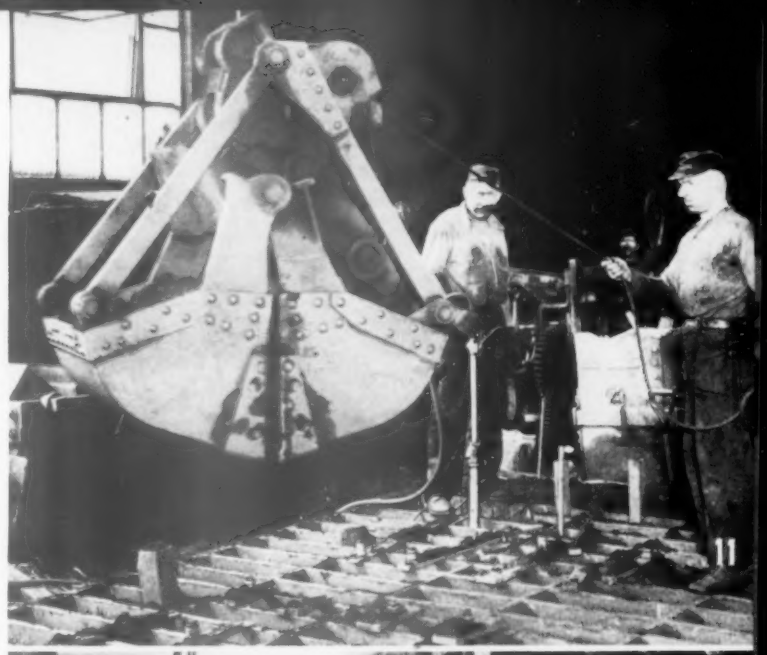
moving belt from the hoppers by vibrating feeders located at the bottom of each hopper. The feeders consist of a metal trough, mounted on flexible leaf springs and vibrated at high speed by an electromagnet. The magnet, energized by pulsating current, pulls the trough sharply down and back, then the leaf springs return it up and forward to its original position, although not so sharply as the down pull.

As the trough is pulled sharply down and back the material being carried falls perpendicularly to a new position forward in the trough. Then, as the leaf springs return the trough up and forward, the material is carried with it. When this action is repeated at high speed, the material in the trough flows like water. Rate of flow can be controlled from a thick, fast flow to a thin trickle. Various sizes permit the handling of practically every kind of bulk material at rates from 8 ounces per hour to 1000 tons per hour—all of them controllable from maximum flow to a mere trickle.

Delivery of molding sand to molders is illustrated in Fig. 2. In addition to its role as molders' delivery truck, the "motorized wheelbarrow" is used to haul sand from storage to the mixer. It is a versatile unit and finds many uses throughout the foundry. Powered with a 3-hp aircooled gasoline engine, it has a capacity of 1000 lb and is designed to carry almost any type of wet or dry material in either a bucket or on a platform deck, the bucket and platform being quickly interchangeable. Bucket dumps mechanically, and returns automatically to a normal, locked position. The machine is designed to turn in its own radius, climb a 20 per cent grade and crawl through loose sand on the foundry floor.

Trucks, such as that shown in Fig. 1, also are useful utility vehicles for hauling practically all types of foundry materials. It is a dump type truck with front wheel drive and single rear steering wheel. Most trucks of this type have a capacity of around 2 cubic yards.

Fig. 5 illustrates the movement of prepared sand by inclined belt conveyor to molders' hoppers. The continuous power-driven mold conveyor around the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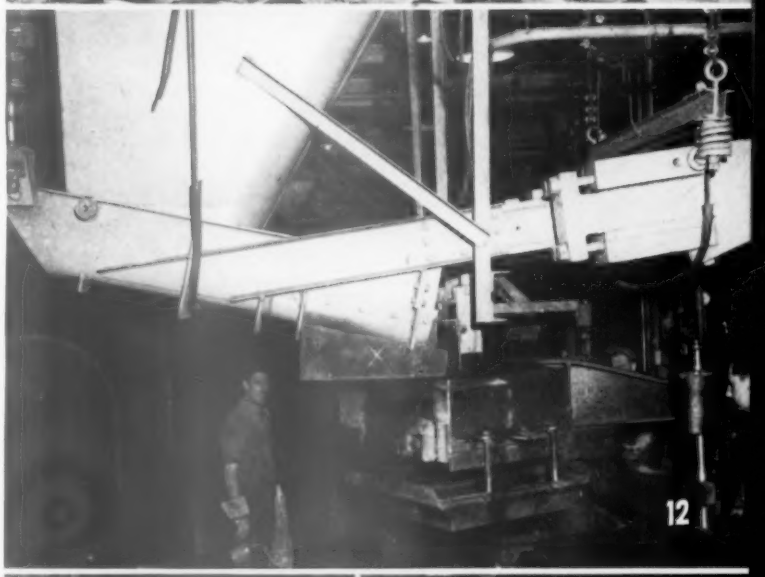
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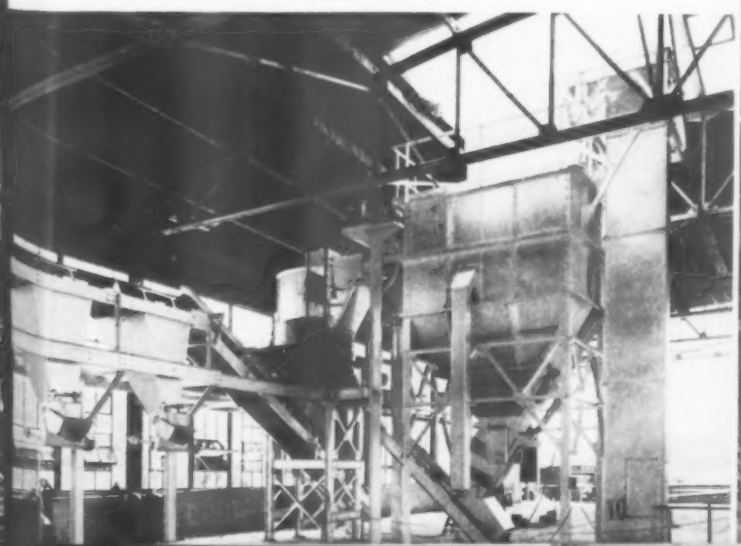
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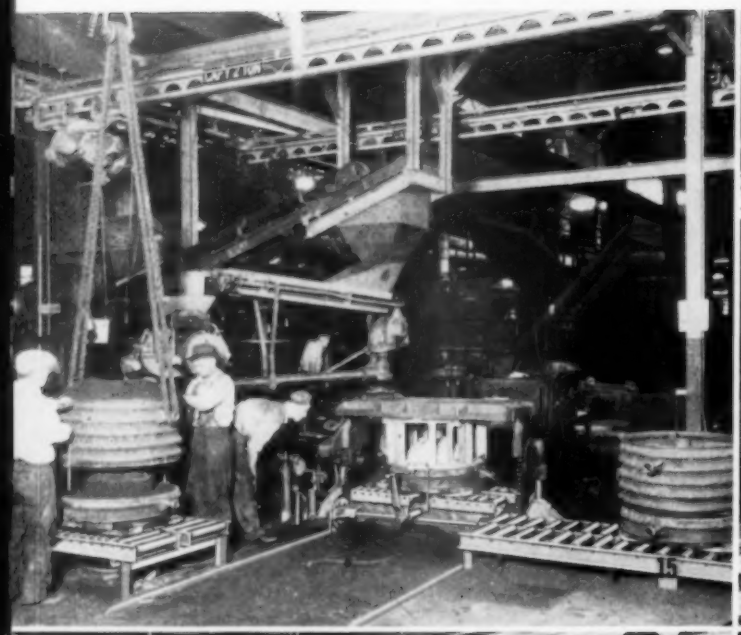

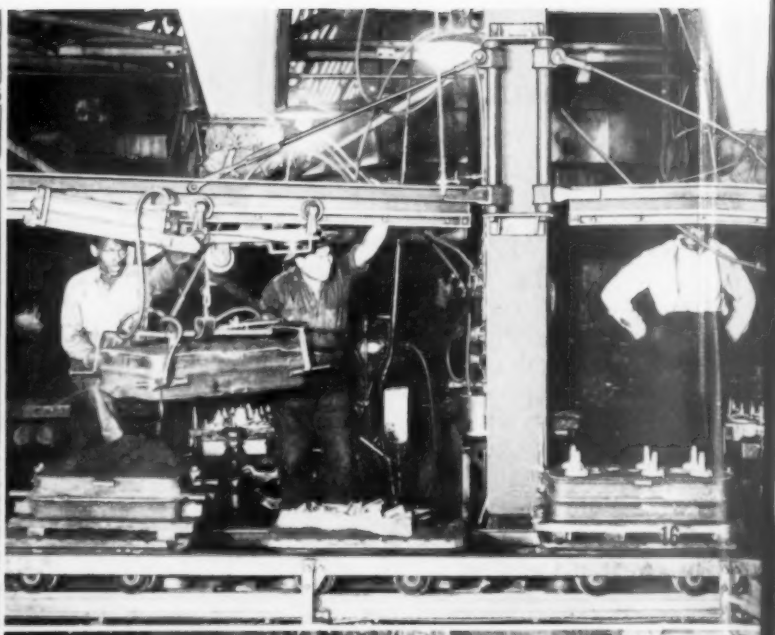

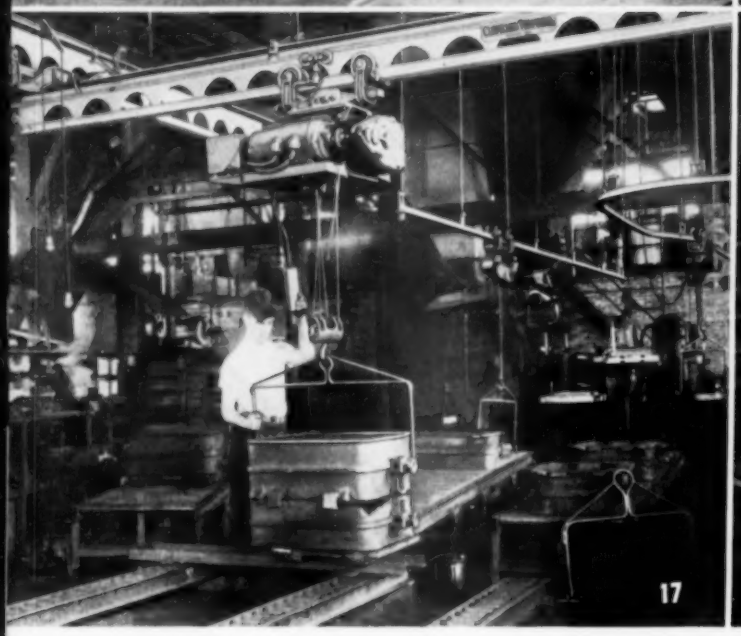

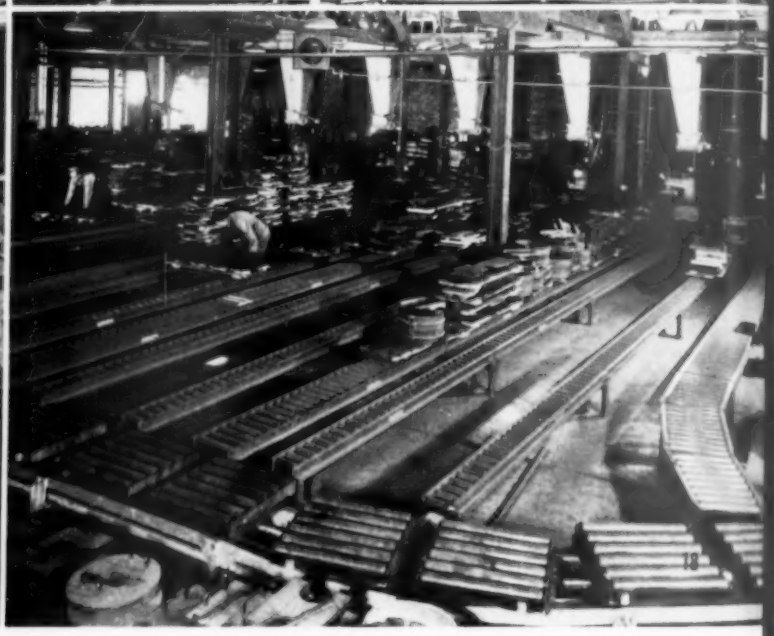

Handling Materials

molding area also can be seen. It carries molds from the molding station to pouring, to shakeout and back to the molders to repeat the cycle.

Methods of distributing conveyor carried sand to individual hoppers above the molding machines are pictured in Figs. 4 and 7. A sand distributing belt conveyor with v-plows discharging into molders' hoppers is shown in Fig. 4. The first two plows are lifted above the belt and permit the sand to pass by. The third set of plows is lowered and is pushing the sand off each side of the belt into the hopper.

Another type of sand distributing conveyor is that shown in Fig. 7. It is a scraper conveyor and pushes the sand along a trough. Sliding gates on top of the hoppers over which the conveyor passes may be opened to permit sand to fall into the hoppers.

Fig. 10 pictures a new sand handling and distributing system. At right is an elevator which brings sand from below the floor to the large storage hopper just to the left of the elevator. This hopper, in turn, discharges sand as needed through a chute in the bottom. The sand falls into a bucket which is pulled up along a track and emptied into the muller. Prepared sand from the muller falls onto a belt conveyor which carries the sand up and along the top of the hoppers which feed the molding machines. Sand is swept off the belt into the hoppers by a system of paddles.

Closeup view of an elevator similar to the one shown in Fig. 10 is illustrated in Fig. 6. Sand or any loose bulk material is fed into the scoop at the bottom and is carried upward by a series of buckets mounted on an endless belt which travels inside the elevator frame. The material is dumped at the top and comes out a chute. (*Please turn to page* 238)

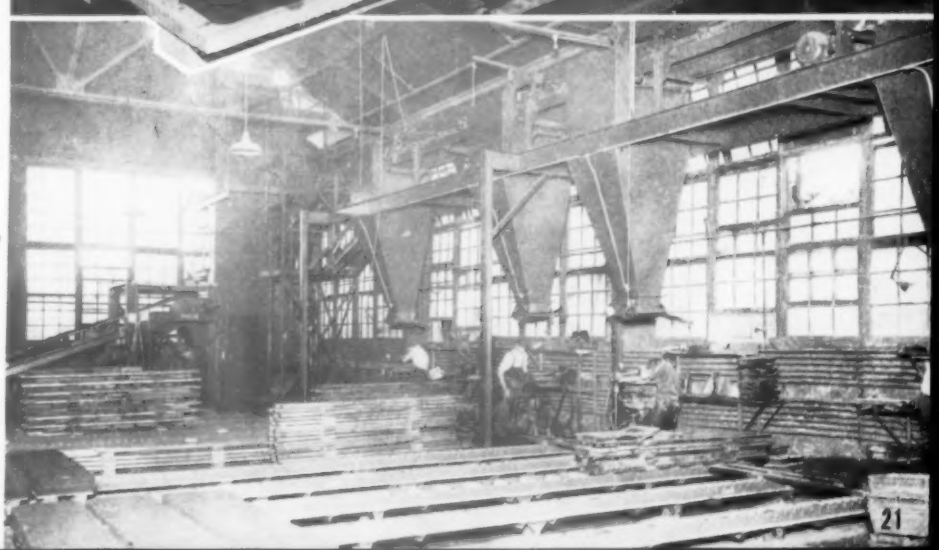

Fig. 15—Production line molding through use of gravity conveyors and hand-pushed transfer car

Fig. 16—Free swinging jib cranes lift molds from molding machines to conveyor

Fig. 17—Air hoist traveling on tramrail is used to close molds

Fig. 18—Molds are pushed along the gravity conveyor from molding machines in the background to power conveyor in foreground which transfers them to pouring station

Fig. 19—Closing a mold on continuous car-type power conveyor

Fig. 20—Air motor hoist utilizes roll-over rig in handling mold halves

Fig. 21—Boards laid across two roller conveyors increase mold storage space

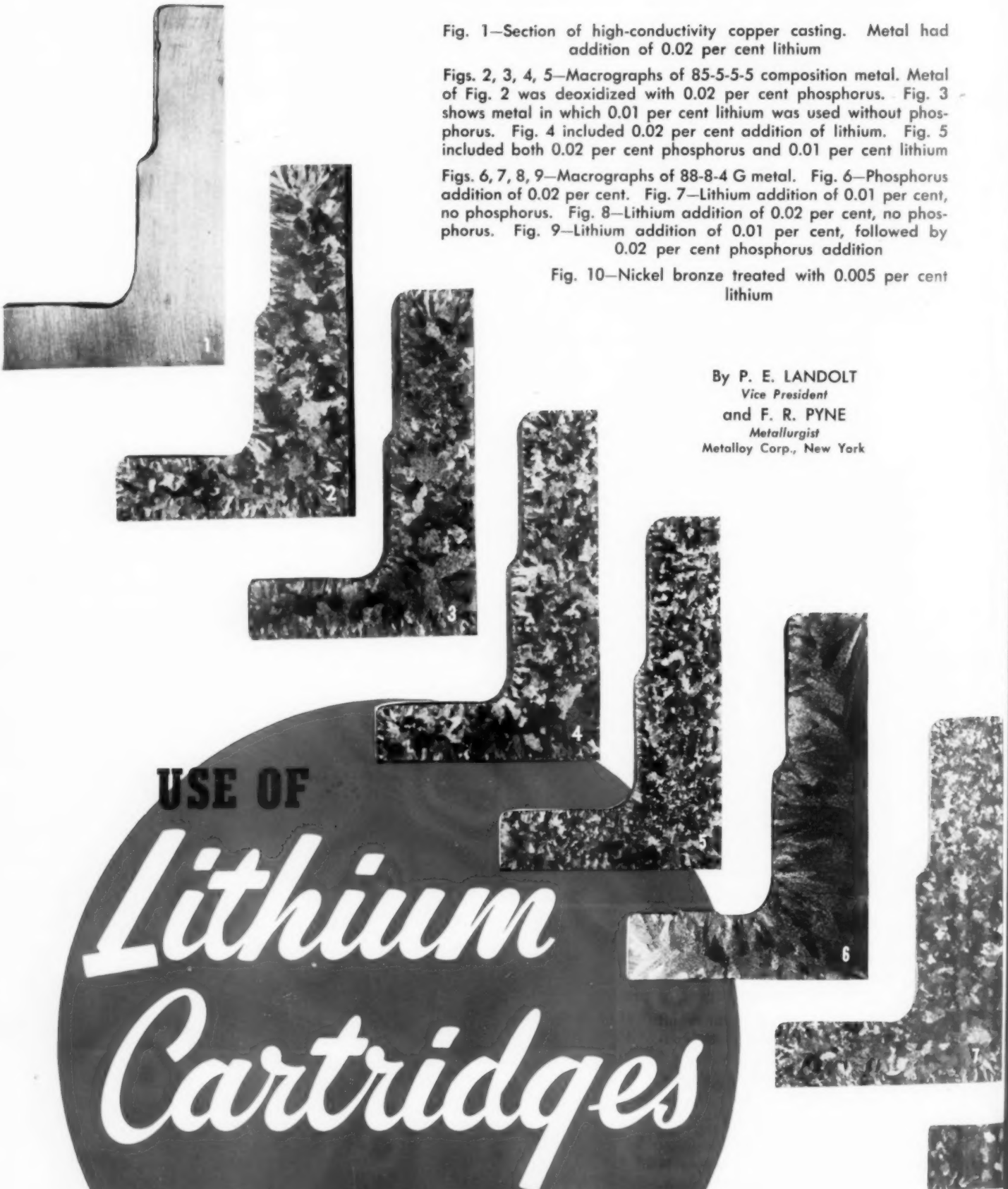

Fig. 1—Section of high-conductivity copper casting. Metal had addition of 0.02 per cent lithium

Figs. 2, 3, 4, 5—Macrographs of 85-5-5-5 composition metal. Metal of Fig. 2 was deoxidized with 0.02 per cent phosphorus. Fig. 3 shows metal in which 0.01 per cent lithium was used without phosphorus. Fig. 4 included 0.02 per cent addition of lithium. Fig. 5 included both 0.02 per cent phosphorus and 0.01 per cent lithium

Figs. 6, 7, 8, 9—Macrographs of 88-8-4 G metal. Fig. 6—Phosphorus addition of 0.02 per cent. Fig. 7—Lithium addition of 0.01 per cent, no phosphorus. Fig. 8—Lithium addition of 0.02 per cent, no phosphorus. Fig. 9—Lithium addition of 0.01 per cent, followed by 0.02 per cent phosphorus addition

Fig. 10—Nickel bronze treated with 0.005 per cent lithium

USE OF *Lithium* *Cartridges* IN TREATING HIGH-CONDUCTIVITY COPPER AND COPPER-BASE ALLOYS

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LITHIUM has been used for some years in nonferrous foundries for deoxidizing and degasifying copper-base alloys, and for the production of sound high-conductivity castings.

The difficulty of controlling the application of lithium metal when used in the small quantities required in foundry work, led to the development of lithium master alloys containing several per cent of lithium, the balance being copper, zinc or other suitable metal.

While this type of addition agent had many advantages, its use was accompanied by the disadvantage of having to saw or break the alloy to obtain the weight desired for the necessary addition. This caused considerable loss due to the resulting sawdust or fines and thereby increased the cost. Moreover such master alloys were not always homogeneous and were quite expensive to produce.

In order to overcome these disadvantages, the Metalloy Corp. has introduced lithium cartridges consisting of a definite amount of metallic lithium hermetically scaled in copper tubing. These cartridges are available in three sizes containing 2.25 grams, 4.50 grams, and 9.0 grams of metallic lithium corresponding to 0.005, 0.01, and 0.02 pounds of lithium, respectively, these being the usual additions per 100 pounds of metal. By using a suitable combination of these cartridges it is readily possible to obtain any desired amount of lithium and avoid the disadvantages mentioned previously.

In the practical application of the lithium cartridges it has been found advantageous to use a 6-in. length of 1-in. angle iron, to the center of which is welded a rod of convenient diameter and length for plunging the cartridges into the metal. The cartridges are placed in the angle iron and secured by a few turns of iron wire or other suitable material.

In order to determine the effect of lithium cartridge additions on the properties of sand cast copper-base alloys and high conductivity copper, a series of tests was conducted by a leading commercial foundry under conditions of regular foundry practice. The pattern selected for the tests consisted of a bushing 5 in. in diameter with a 1-in. core, the depth of the bushing being 3 in. Standard cast-to-size test bars were made with each pour in order to obtain the physical properties.

Castings were made using the following materials: 1. High conductivity copper. 2. 85-5-5-5 composition metal. 3. 88-8-4 G metal. 4. Nickel bronze—18 per cent nickel.

In accordance with the regular practice of the foundry all melts were made in an oil-fired furnace, and a charcoal cover was used during the melting. All melts were 100 pounds and the metal poured at approximately 2100°F. The molding sand used was No. 1 Albany having a moisture content of about 6 per cent.

High Conductivity Copper—For this test high-conductivity bus-bar scrap was used and an addition of 0.02 per cent lithium made. For this test it was not considered necessary to cast test bars as only the resulting electrical conductivity and density of the metal were desired. A section measuring ¼ x ¼ x 2 in. was cut from the casting and sent to one of the leading testing laboratories, which reported an electrical conductivity in the as-cast condition of 98.1 per cent I. A. C. S.

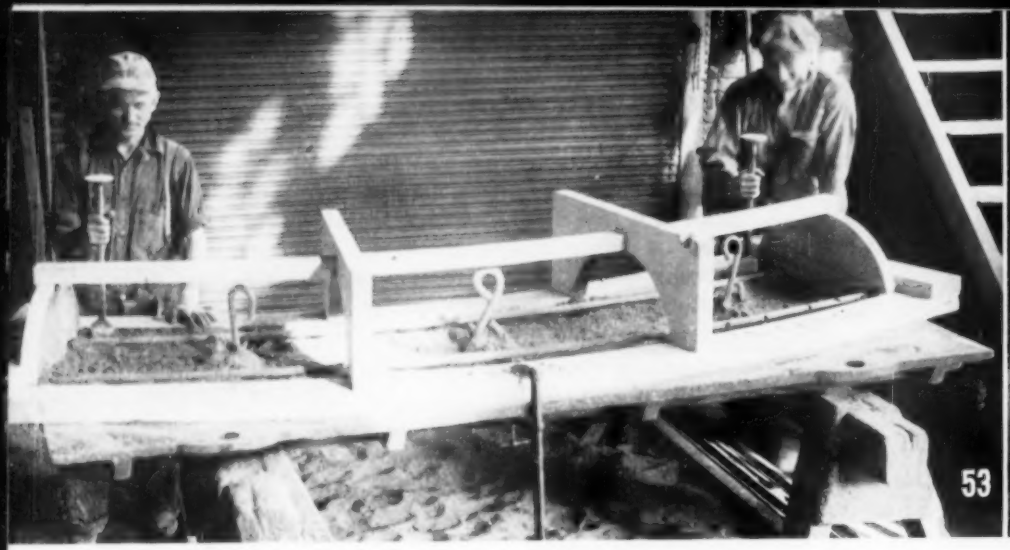
The specific gravity of the metal was found to be 8.90, indicating absence of porosity which is also evidenced by the sound section shown in Fig. 1.

85-5-5-5 Compositon Metal—In the series of tests made on this widely used alloy, it was desired to obtain some indication of the improvement in grain size due to lithium additions. As a standard for comparison a casting was made according to the customary procedure, using 0.02 per cent of the phosphorus as a deoxidizer, added in the form of 15 per cent phosphor copper. Test bars were cast and gave the following properties: Tensile strength 33,850 psi; elongation 22.8 per cent. The resulting grain size is shown in Fig. 2.

This was followed by a test in which the lithium addition was 0.01 per cent, no phosphorus being used. The resulting physical properties obtained from the test bars were: Tensile strength 39,550 psi; elongation 35.0 per cent. This showed a marked increase in both tensile strength and elongation. The resulting grain size was approximately the same as obtained for the standard, and is shown in Fig. 3.

In the next test the lithium addition was 0.02 per cent, no phosphorus being used. The physical properties obtained on this test were: Tensile strength 34,050 psi, elongation 24.3 per cent. These show a considerable decrease from the previous test though somewhat greater than obtained with the standard. However, there was a marked reduction in the grain size obtained, as may be seen in Fig. 4.

A test was then made in which both lithium and phosphorus were used. The standard phosphorus addition of 0.02 per cent was made, followed by a lithium addition of 0.01 (*Please turn to page* 262)



PATTERNS and MOLDING for steel castings

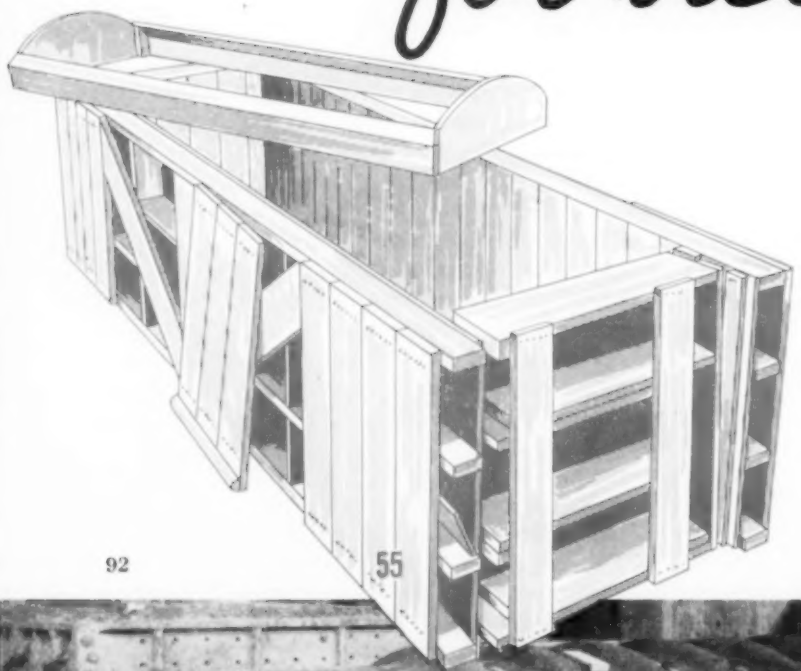
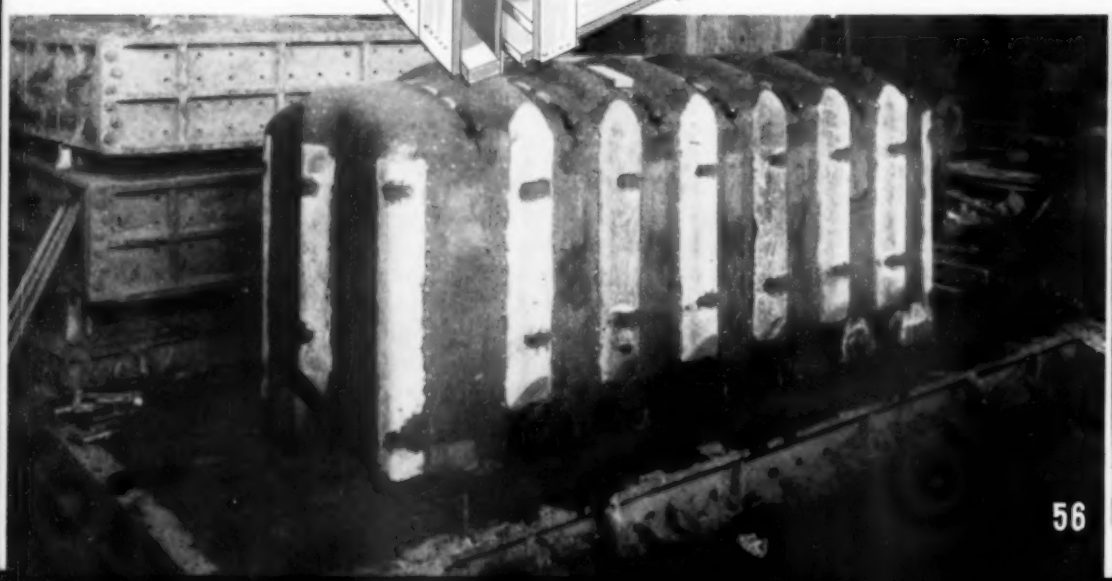


Fig. 53—Skeleton corebox showing core rods and lifting hooks in place. Strikes which form part of the box are the vertical wood members equally spaced from the ends and each other

Fig. 54—Partially completed core showing method of building up with coarse material such as cinders in the center covered by a thin layer of sand

Fig. 55—Another type of skeleton corebox which is set up on the drag mold and rammed in that position



G METHODS

By JOHN HOWE HALL
Consultant
Swarthmore, Pa.

In this fifth and concluding article discussing molding practice in the steel foundry, the use of various types of sweeps to form the mold cavity is discussed. The first of this series was presented in the November, 1948, issue

WHEN using cement-bonded sand, large cores made in boxes with skeleton tops need not be taken from the box until they have set the necessary length of time. The problem of rolling them out on a sand bed, or lifting them when green, is therefore entirely avoided. In following this practice, however, it is usually desirable to cover the inside of the lower half of the box with loose sheets of tin plate, to prevent the sand from sticking to the box and coming off in patches.

Instead of using a solid bottom half box with skeleton top, the core may be made in halves in a skeleton box and bolted together. Figs. 53 and 54 show the operation of ramming up the halves of a cement-bonded sand core in a skeleton box. In these views the core rods and lifting hooks are seen in place, and the strikes used to form the surface of the core, which in this case are part of the framework of the box. Fig. 73 shows the skeleton half box for another large core, and Fig. 74 the core made in it, the two halves being held together by means of the bolts whose heads show in the view.

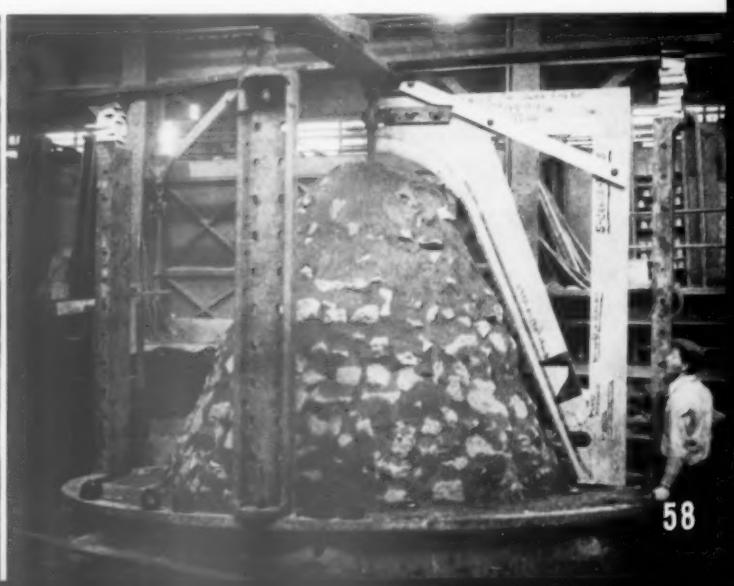
A skeleton-top corebox of a different type is shown in Fig. 55, and in Fig. 56 is seen the completed core made in this box, set on the drag sand of a mold for an annealing box. This core is rammed with the box in place on the drag sand, and the corrugations on the top of the core are formed by means of supplementary cores made separately and held in place in seats formed in the main core.

Instead of patterns, sweeps of various types can be advantageously employed in steel foundry practice. Steel rolls, for instance, when molded in sand, are quite often made in two-piece flasks divided lengthwise, and provided with half circular seats in each end plate to support a heavy spindle running the full length of the mold. On this is mounted a flat sweep, generally of heavy hard wood armored with a steel cutting edge, and so shaped that when revolved about the spindle, the cutting edge generates the outline of the desired roll. Sand is rammed into the flask, up to and beyond the line of the proposed surface, and the spindle and sweep are set in the bearings. By means of a crank fixed to one end, the spindle is revolved and scrapes the surface of the sand to the outline for one half of

Fig. 56—Appearance of core made in the box shown in Fig. 55. The projections which form the corrugations on top, sides and ends are separately made, supplementary cores

Fig. 57—Sweep method of forming a cavity of the desired contour in a mold

Fig. 58—Early stage in sweeping up drag mold for a large cinder pot or slag ladle



the mold, as is shown in Fig. 57.

To secure more rapid solidification of the steel in these molds, the sand is often cut away at a number of points, and heavy iron or steel pieces are put in place. These conform roughly to the outline of the casting but are not allowed to form the actual mold surface, an inch or two of sand being rammed over them and swept to the desired outline. They thus act as chills, but cannot stick fast to the casting as they might if they were actually in contact with it.

A second part is made similarly and the two are clamped together and set on end for pouring. The ingate for these molds is commonly formed out of tile bricks set in a number of flanged iron or steel pipe sections clamped together end to end, outside the flask, and connecting with an opening through flask and sand at the bottom.

Sweeps of a somewhat different type, and segmental patterns mounted on revolving arms, are widely used in making such castings as gear blanks, wheels and sheaves of large diameter, consisting of a hub, spokes or plate, and rim. This method of molding is modeled somewhat on the loam-sand practice by which foundrymen have for years made large cast iron chemical pots or kettles, church bells and other castings of circular cross-section. The advantage of this method is that a spindle and arm, a few sweeps of suitable shape and a comparatively small number of coreboxes can be substituted for the very expensive pattern that would be required to make a large casting in the conventional manner.

In this method of molding, the spindle is firmly fixed in a vertical position in the center of the drag flask, or in the foundry floor if no drag flask is to be used, and the revolving sweep arm is mounted on it. Sand is rammed into the drag to a little above what is to be the bottom of the completed mold, and a "strike" of proper shape, mounted on the sweep arm, is used to scrape the sand to the correct outline; it is, of course, slicked down smooth with the trowel after the sweep has brought it to the right level. If the face of the wheel or gear blank is not too wide, the sand forming the perimeter of the mold may be swept at the same time, but usually a second strike mounted on the end of the arm is used to form this portion of the drag separately.

On this swept-up bed are set the cores required to shape the spokes, the inside face of the rim, and the hub. A single corebox will serve to make a set of these segmental cores. One layer of them is set on the bed sand, and a second course, in inverted position, serves as the cope for this part of the mold. Instead of forming the outside of the rim as part of the swept drag mold, cores also are sometimes used for this portion of the mold. For sheaves with grooved rims, of course, this is the simplest practice to adopt. In this method, the bed is swept flat and made wide enough so that both the cores forming the spokes and those shaping the outside of the rim can be set on it.

If the gear has a central plate, instead of spokes, the upper layer of cores must be set on chaplets to space them the right distance from the lower ones. Another box is used for the cover cores to close the

Fig. 59—Appearance of drag mold for cinder pot after sweeping up

Fig. 60—Some sections of the cheek flask for the cinder pot in place

Fig. 62—Sweep set for making the drag bed for a centrifugal pump runner

Fig. 63—Completed bed for pump runner

Fig. 64 — Separately made core in position on the bed

Fig. 65—Wood form is placed over the top of the core

Fig. 66 — Flask is supported on a number of wood blocks placed around the periphery of the core

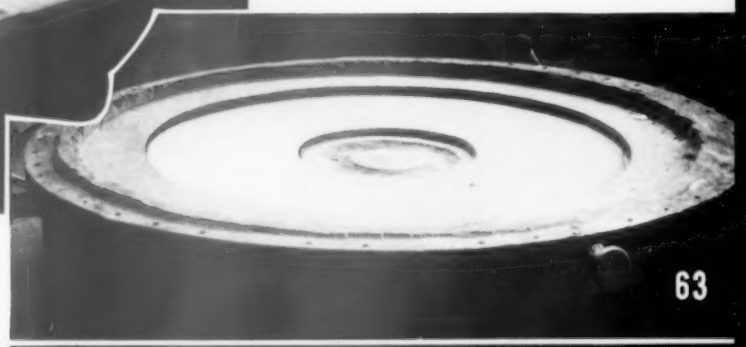
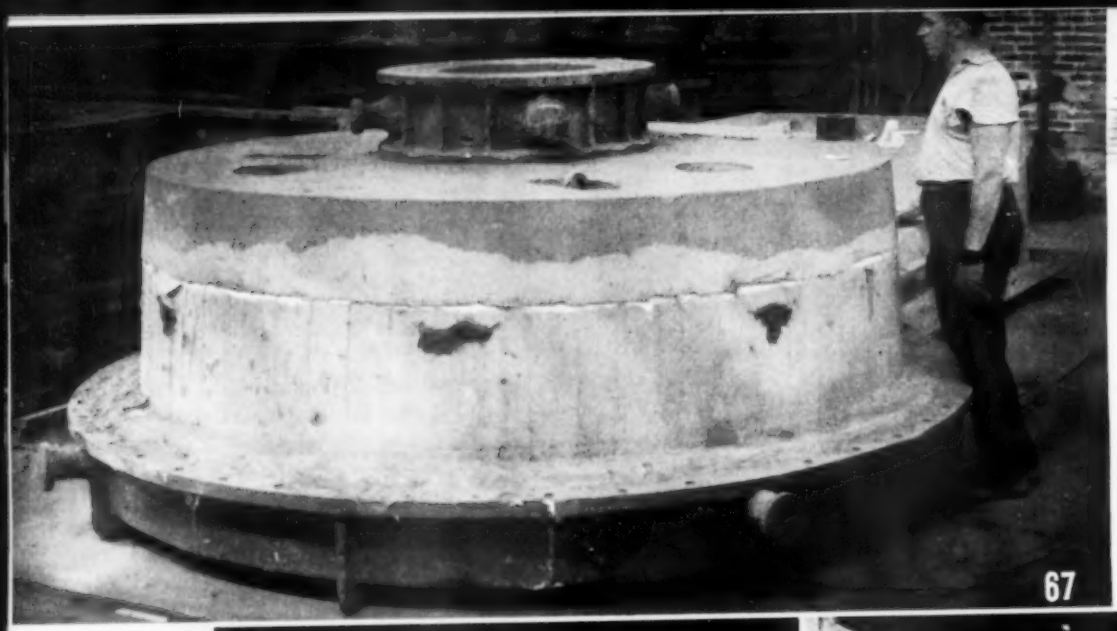


Fig. 61—Cinder pot casting with gates and riser attached

PATTERNS and MOLDING METHODS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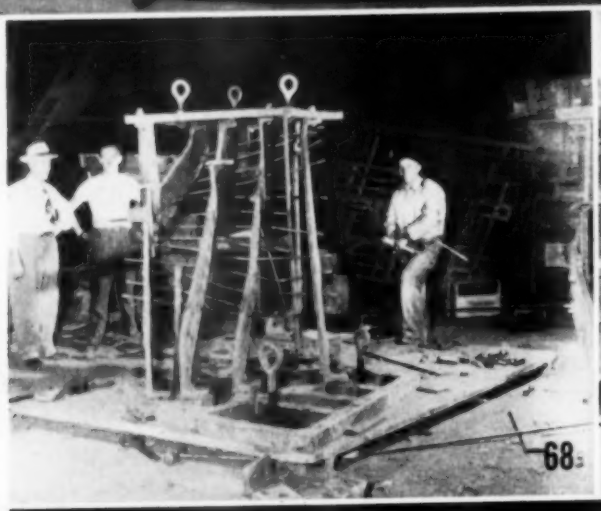
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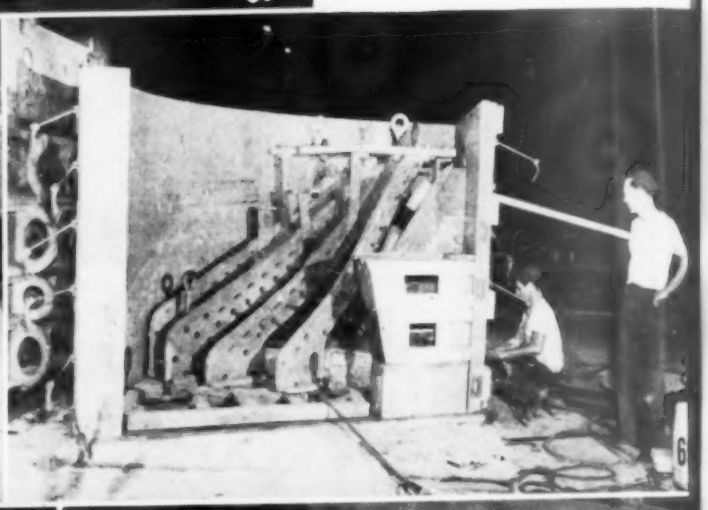

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rim, with openings in them, on which are set cores or rammed-up small flasks to shape the risers required. A similar flask set over the hub provides the head or heads to feed the hub, and a central core forms the bore of the hub. The ingate is usually carried down through the segmental cores and leads to tiles set in the swept-up drag.

Instead of making the mold for a gear blank in this manner, it is often advantageous to place a "cheek-flask" above the drag, and sweep out in it the form of the outside of a continuous annular head, carrying the complete outline of the rim up to the necessary height. Cores of the usual type are then placed to shape the bottom of the spokes, and a central core, made in one or more pieces, is set on them. As a rule, a head covers the entire hub, and the core that shapes the bore is brought up through this head to the level of its top, where it is tied down by the same cross member that keeps the main core from floating. The large central core forms the outside of the hub and of the head on it, the top of the spokes, and the inner faces of the rim and the annular head on it. No cope is needed, since the drag, the cheek and the cores make up the completed mold. The large central core may be made in one or more corebox es, and an arbor is usually required to give it the necessary strength.

If the casting is designed with two sets of arms, as it often is when the face of the rim is very wide, the central core is divided into an upper and a lower portion, and the upper set of arms is formed by suitably shaped openings in the two parts. The same method can, of course, be followed when the spokes are formed by means of segmental cores, and the rim closed with cover cores.

The use of an annular head covering the entire rim of the wheel, in addition to its economy of pattern equipment, has the advantage that the complete open head ensures a perfectly clean casting at this vital point. Obviously, trapped loose dirt, or any sand that spalls off as (*Please turn to page* 260)

Fig. 67—Completed mold for centrifugal pump runner with heads and gates in place and ready to be tied down

Fig. 68—Arbor for supporting core in large hydraulic turbine runner

Fig. 69—Back of the corebox is solid while the front is arranged for attaching sections as sand is rammed in place

Fig. 70—Showing how sectional front is attached as work proceeds

Fig. 71—First two cores in place on swept bed showing temporary supporting means

Fig. 72—Cores are all set except for closing piece

Fig. 73—Skeleton box for making central core in halves

Fig. 74—Completed central core bolted together

Fig. 75—Gate core used at bottom of mold

Fig. 76—Central core in place

Fig. 77—Separately rammed cope is set over the main cores, and the whole is clamped down ready for pouring

Fig. 78—Hydraulic turbine runner casting loaded for shipment

Questions AND Answers

Heavy Section Porous in Middle

Q.—For your information and to aid us in solving a problem, we are sending a piece of cast iron broken from a brake flange. This, as you will observe, contains a porous section, and we would like your opinion as to the cause. Analysis shows 1.99 per cent Si, 3.40 per cent TC, 0.117 per cent S, 0.33 per cent P, 0.53 per cent Mn, and 0.51 per cent Ni. About ⅜-in. was machined from the inside and 3/16-in. from the outside.

A.—Since the porous area under question is on the inside of the flange, the first conjecture is that it might be the result of the metal not being able to lie quietly against the mold face. However, examination of the fracture under a low-power microscope showed that it is due to lack of feed since numerous small interconnecting passages with the familiar dendritic or "pine-tree" structure are clearly revealed.

You mention that ⅜-in. was machined from the inside, and 3/16-in. from the outside, and rough measurement of the area shows that it is about ⅜-in. from the outside, which would place it approximately in the center portion of the piece as originally cast. Hence, we suggest that you check your method of gating and risering and see that it is arranged to provide proper feeding of the central section.

Permanent Mold Gives Trouble

Q.—We operate a foundry in Belgium, and are having trouble with die casting brass by the gravity process. Is there a treatise or reference book available which gives complete information regarding dies, runners and risers, heating of molds, coating, nature of brass best suited for the process, etc.? We know that some founders use metallic cores which are put in place in the mold and, after casting, are removed or recovered by moderate heating of the cast parts. We presume that these cores are protected from the heat generated by the molten brass, by a suitable core coating.

A.—So far there has not come to our attention any book giving information on gravity die casting or what in the United States is called permanent molding of any type of alloy. Most of the firms engaged in this method of making castings are rather reticent about discussing their practices and procedures, and many have their own mold designers.

As far as gating and risering are concerned, they must follow the same principles as are employed in sand molding—supply molten metal to the cavity with the least turbulence, and feed the casting internally during solidification. Naturally, the system must be arranged so that solidification or freezing begins at the point farthest from the gate and proceeds uniformly to the gate. Since this is not always practical to obtain those results by mold design alone, artificial aids such as heating or cooling certain sections of the mold are used.

Mold faces usually are coated with some type of material to prevent erosion by the molten metal, to prevent sticking of the casting, and to vary the cooling rate. Coating materials include whiting, refractory clays, talc, aluminum oxide, etc., suspended in water with or without sodium silicate. Sometimes rouge and graphite also are added. A discussion of the various types of materials employed appears in the February, 1949 issue under the title "Die Coatings for Permanent Mold Casting."

Cores used in molds, as you indicate, may be made of gray iron or of heat-resistant steel. Selection of the material depends on a number of factors such as size, location in the mold cavity, period of exposure to heat of the metal, whether they will be removed mechanically, etc. In general such cores are protected and lubricated by graphite applied as a water suspension, either by dipping or brushing. In the article previously mentioned coatings for various applications are described.

Must Change Iron Composition

Q.—We are charging our cupola as follows: 450 lb No. 2X pig iron, 150 lb steel rail, 900 lb returns and fair quality machinery scrap which results in an iron containing 3.20 per cent TC, 0.65 per cent Mn, 0.167 per cent S, 0.424 per cent P, and 2.12 per cent Si. Our job foundry production consists of both small and medium large castings running from 1 to 3000 lb, and the same mixture is used throughout. We have received complaints about our large castings with wall thickness of 1¼ to 1½ in. as having hard spots which trip and break the cutting machine tool. The castings otherwise are reasonably soft. Will you give us your opinion on the cause of the hard spots, and the means of overcoming the same?

A.—Your problem is an excellent example of the futility of trying to make a wide variety of section thicknesses from one gray iron. While it is possible to effect a compromise which will be satisfactory for a narrow range of thicknesses, it is impossible to produce castings ranging from ⅛ to 1½ in. in thickness from one composition without sacrifices in mechanical properties or characteristics some place along the line. If the composition of the iron is such that suitable heavy section castings are made, the light section castings will be too hard, and if the analysis is satisfactory for the light sections, it will result in weak, open grain structures in the heavy sections.

The latter condition is your trouble; breaking the cutting tools results from digging into soft, open grain structures and then catching on the edge of the harder area, rather than from the tool striking hard spots. We believe that if you will examine the

machined areas, you will note that the tool breakage occurs where the area is much darker in color and not a bright, shiny area.

Remedy for the condition, of course, is to decrease the silicon content to provide a closer grain structure in the heavy section castings. For the section involved we suggest around 1.50 per cent Si. Naturally, such as iron will result in trouble with the lighter section castings, but that can be taken care of by adding ferrosilicon or other inoculating or graphitizing material in the ladle.

Possibly you may find it more satisfactory to use split charges in the cupola—employing sufficient low-silicon charges for the heavy section castings, and then switching to higher silicon charges for the lighter section castings. Particular procedure to follow will depend upon the tonnages of the different types of castings involved. If it is preponderantly on the heavy side, it would be better to use low-silicon charges with ladle additions, while if on the light side, it probably would be more satisfactory to use the second method of split charges. In either case it would be necessary to watch carefully to see that the right composition was poured into the particular molds.

Developing a Patina on Brass

Q.—Will you please advise us how we can oxidize red brass (85-5-5-5 alloy) to obtain the different colors? We use liver of sulphur and all we can get is a black color on our castings.

A.—If by oxidizing you refer to the commonly observed brownish color it usually is produced by immersion in the so-called liver of sulphur solution. As you undoubtedly know, sulphide of copper, which is the ultimate result of the action of sulphides, is black, but in thin layers it may range from an iridiscent effect to brown. Hence, your trouble may arise from two causes. One is that the solution is too strong, or the article is left too long in the solution.

Usual solution is 2 oz of liver of sulphur per gal, and the temperature about 175° F. Time of immersion is 1 to 2 minutes. However, you may have to experiment on each of the factors mentioned to obtain the desired results. It also should be mentioned that part of the work in obtaining satisfactory finishes is use of wet or dry scratch brushing after rinsing to remove any loose coating.

Wants To Analyze Gray Cast Iron

Q.—We operate a very small foundry; customers are becoming more particular, and we should have some way of analyzing castings. Does anyone make or assemble what you might call a kit that could be used in the analysis of the various elements that go into cast iron? Also does anyone publish a manual on the analysis of cast iron?

A.—So far as we know there is no magical book or kit that will serve the purpose you have in mind. Instructions for analyzing cast iron appear in a number of books on chemical analysis of metals and alloys, more particularly those on the ferrous metals, as well as, for example, in *Principles of Iron Founding* by the late Dr. Moldenke. However, in each case the author assumes that the reader has had a metallurgical or chemical training. Telling a man without the proper background how to analyze a piece of cast iron may be compared in a general way with the futility of placing a sheet of music in the man's hands, and expecting him to give a rendition of the score on any musical instrument.

Skill and experience are a necessary attribute in conducting analytical determinations as well as interpreting the results for practical application. Unless you intend to engage the services of an individual with the proper training, we believe that you will be much farther ahead by forwarding drillings from test specimens to a commercial laboratory and have the necessary analytical work performed.

Metal Chill Fails in Results

Q.—We have just completed casting some chilled wheels for a crane, and have encountered a problem. Wheels are about 16 in. in diam and the cross section where we attempted to chill is 1 in. Cross section of the chill used was 2 in. yet the casting showed no greater hardness at the chilled section than on the rest of the casting. Is there any rule for determining chill thickness in relation to casting thickness?

A.—While you do not mention the composition of the iron you attempted to chill, we suspect that your difficulty arises from that source. In other words, the silicon content was not sufficiently low to prevent graphitization from occurring even under rapid cooling conditions where the chill was applied. Hence, if you fracture one of the wheels you will probably find a much finer grain or structure in the chilled sec-

GANGWAY! By J. A. PATTERSON

"You don't mind if a body stops and gets warm, do you sonny?"

Questions AND Answers

tion than in non-chilled sections of equal thickness.

Usual rule of thumb for chiller thickness is about three to four times that of the section to be chilled. However, in your case with a chill only twice that of the section, we would expect some evidence of chill or white rim if the composition were in the normal range for the section thickness involved, say 1.75 per cent Si for 1 in. section thickness. If you do not want to or cannot change your present composition, it will be necessary to add some carbide stabilizing element such as chromium or possibly tellurium in the ladle when pouring the wheels so that you can obtain the desired chill.

Producing Patterns in Resins

Q.—We are interested in synthetic resin or plastic used to manufacture matchplates, and would like to know where we can secure those materials. We also would like to obtain complete instructions as to the use of this material in the manufacture of patterns and matchplates.

A.—Type of resin used for making patterns and matchplates is the castable, thermosetting variety which may be secured from a number of manufacturers. For matchplates the resin usually is reinforced with fiberglass. Two articles on the subject have appeared in THE FOUNDRY which describe the method of producing patterns, and one on making matchplates. The articles are as follows: "Casting Patterns in Phenolic Resins" by C. R. Simmons, February, 1946; "Matchplate Patterns from Phenolic Casting Resin" by C. R. Simmons, November, 1946; "Matchplates Made from Plastic," August, 1948.

Briefly, the process consists of making a plaster mold from the master pattern. After drying the resin is poured into the plaster mold, and mold and contents are heated to polymerize or harden the resin.

Describes Core Booking Method

Q.—We will appreciate receiving any information that you may have on the "booking" of cores.

A.—Booking of cores is an operation of bringing two halves of a green core together to form a single piece for baking and thus eliminate the necessity of pasting the two half pieces after baking. Procedure may be pictured by imagining the steps followed in closing of a large, thick book lying open on the table. Assuming that the closer has some consideration for the backbone of the book, he grasps both covers and raises them vertically until the pages meet, and then with a rolling action lowers the closed book to rest on one of the covers—the backbone of the book acting as the axis for the rotations.

In the case of booking cores the two half core-boxes placed edge to edge form the open book. The outer edges of the boxes are grasped just as in the case of the book covers, and raised vertically, holding the inner edges together at the same time. It should be mentioned that these edges contain two or more open hinge arrangements, depending upon the length, which also serve to register the two boxes as well as the axis of rotation. Also the booking operation is carried out on two iron or steel rails or bars about ½-in. or so wide at the face to reduce friction.

After the boxes are booked, they are lowered to the rails. Then the top box is rapped, removed, and the core drier placed in position. The whole is rolled over to place the core drier at the bottom when the other box is rapped and removed, leaving the core in the drier.

Shrinks Are Due to Lack of Feed

Q.—We are enclosing three lever castings about 6 in. long which show a shrink under the heavier section where they are pivoted, and we would like to know what is the cause. We have made these castings without trouble for years, but this shrink has developed in the past three or four months. It is necessary to run our silicon between 2.90-3.00 per cent, and is not new for this casting. We use 1200-lb charges with 40 lb limestone, and our iron leaves the spout at 2700 to 2750°F. Analysis shows 2.98 per cent Si, 0.91 per cent Mn, 0.54 per cent P, 0.126 per cent S, and 3.15 per cent TC.

A.—The shrink in the lever castings is caused by lack of feed to the heaviest section of the casting, and we believe that it can be overcome by enlarging the gate. We note that some of the levers are gated on the end close to the heavy section and others at the opposite end. Our choice would be the first mentioned method, but possibly the patterns are arranged alternately in the reverse order to permit more in a given space. In any event, the gate thickness should be increased so that it does not freeze off before the casting solidifies. You also may have to increase the size of the main runner.

While you state that you have been making the levers without trouble for a long period of time, we believe that comparison of analyses will show that at present the total carbon is considerably lower than in the past, and low carbon iron shrinks more than the higher carbon type iron. Hence, larger gates and risers always are employed to insure adequate feeding.

Surface Is Not Satisfactory

Q.—We have a problem involving streaks or runs on the inside shoulders of a bell-shaped aluminum alloy casting weighing about 9½ lb. These castings are buffed and polished, and the operators are finding it quite difficult to buff the streaks and runs out of the casting. We find by using half new and half old sand, we can eliminate the trouble, but this method is quite expensive. We are using Albany No. 1 and No. 00. Is there anything that can be used in the sand such as bentonite, seacoal, pitch, etc.?

A.—Without a section of the casting to examine the surface condition you mention, it is difficult to supply

(Concluded on page 102)

SPECIFY THE ADDITION OF

NISILOY*

Chilling and consequent machining difficulties were encountered by a foundry specializing in cast parts like these, designed with both heavy and light sections. Nisiloy, added to the ladle, assured ready machinability after many other experiments failed.

for Better Machinability in GRAY IRON CASTINGS

Casting users profit from use of Nisiloy . . . a new, powerful, positive inoculant that promotes better machinability. It contains about 60 per cent nickel, 30 per cent silicon, balance essentially iron.

Faster, easier, lower-cost finishing of gray iron castings may be attained because Nisiloy serves to eliminate localized hard areas or chilled (white) edges and surfaces . . . regardless of sharp variations in section thickness.

Get full information. Send for *your* free copy of a booklet that describes how the dense, gray, machinable structure secured with Nisiloy reduces machining time, tool wear, rejects and costs. Mail the coupon now.

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THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

Questions AND Answers

(*Concluded from page* 100)

a suitable diagnosis. However, we believe that it may be due to a high pouring temperature. Possibly it may be due to some other condition since you mention that it is eliminated by changing the sand to a mixture of half old and half new sand. Addition of the new sand would increase the bond strength of the sand, but your description of the casting surface does not indicate that the difficulty arises from washing or erosion of the mold surface by the molten metal.

If the trouble actually results from lack of bond, you could make additions of bond clay or bentonite to your old sand to bring the strength up to the desired point. To determine that point, it would be wise to take only a small quantity of sand—say enough to make two or three molds, add the bonding material to it, and observe the results. Presumably, you do not have sand testing equipment to determine the amount of bond in the sand, and will have to estimate the amount needed. You might try adding say 2 lb of clay or ½-lb bentonite per 100 lb of sand, and note the effect. On the next trial a like addition could be made until the sand has the desired characteristics.

Alloys Similar in Composition

Q.—Can you tell us the analysis of No. 212 aluminum alloy? We have been told that it is the same as No. 12, but we are not sure whether that is correct.

A.—The information supplied to you that the present No. 212 aluminum alloy is similar to the old No. 12 is correct. Composition of No. 212 is 7.0 to 8.5 per cent Cu, 0.08 to 1.2 per cent Fe, 1.0 to 1.5 per cent Si, and other impurities not over 0.3 per cent. The old No. 12 called for 7.0 to 8.5 per cent Cu, 0.2 per cent maximum Zn, and total impurities not over 1.7 per cent. It was found that inclusion of iron and silicon in the ranges mentioned for No. 212 gave a better alloy as far as foundry and mechanical properties are concerned with the result that No. 212 practically has superseded the No. 12 alloy.

Sand and Dross Spoil Surface

Q.—We are sending you a section of an aluminum plate casting 3/16-in. thick with which we are having considerable trouble. You will note the numerous small holes in the surfaces which show up after wire brushing. Castings have to be polished, and we cannot grind enough off to get rid of the holes. We try not to ram the molds too hard, and pour at about 1450°F.

A.—After any cleaning operations have been performed on a casting, it usually is difficult to ascertain the cause of surface blemishes since the source is removed in many cases. However, after carefully scrutinizing the surface with the aid of a magnifying glass (a very useful, inexpensive instrument) we found two causes of the small holes and pit marks prevalent over the surface. One is sand grains imbedded in some of the holes, and the other is dross or slag just under the surface and covered with a thin film of metal.

Therefore, we believe that the larger holes probably are caused by dross or slag carried in with the metal stream which lodges at the interface of the cope mold and the metal in some cases, and in others lies just under the surface. The film covering the dross in the latter case varies in thickness, and where very thin may be removed in the wire brushing operation along with the dross so that no evidence is left.

The smaller pits and holes probably result from loose sand being washed along by the flowing stream of metal. However, it is difficult to determine where it comes from although a likely source is around the sprues and gates. You mention that you try not to ram the mold too hard, and possibly in some places the mold face may be soft enough to permit washing or erosion by the metal stream. This is a particularly important feature on long, thin castings.

Producing Cores for Soil Pipe

Q.—Can you give us any information on manufacture of soil pipe, more particularly with reference to the method of producing cores?

A.—A number of articles have appeared from time to time which describe the various details in making soil pipe. For example, in the June, 1946 issue of THE FOUNDRY you will find descriptions and illustrations covering core making. In this particular installation the core arbors are made of seamless steel tubing about ⅞-in. less in diam than the inside dimension of the soil pipe. Tubing is drilled full of ⅜ or ½-in. holes to provide a vent. In some other plants the core arbors are made of cast iron with the perforations formed by small cores. Core arbors are made about a foot longer than the soil pipe so that they extend to the ends of the flask and can be wedged in place; the flasks have suitable openings in the ends for that purpose.

Core arbors are wetted with water or clay wash before being placed in the core machine. The latter consists of a hopper with a narrow slot or orifice at the bottom through which the sand falls onto the arbor. Height of the hopper above the arbor may vary from 1 to 3 ft depending upon the condition and type of sand. Arbor is rotated by hand or mechanically, and a horizontal bar or straight edge controls the thickness of sand—which must be held within 1/16-in. Extensions of the core arbor, of course, are not coated with sand. Possibly you might be interested in methods of eliminating use of cores by employing the centrifugal process as described in "Casts Soil Pipe Centrifugally" by H. H. Farr in the September, 1939 issue, and in "Centrifugal Casting of Soil Pipe" by R. L. Farabee in the July, 1948 issue.

Suppose your foundry employed less than 100 . . .

If your foundry employed less than 100 workers, would you load ferrous metal into charging buckets by hand—or with a magnet?

There is only one profitable answer to this question when you consider the high cost of today's labor. Yet, thousands of medium-size foundries continue to handle scrap, rails and pig *by hand* in the melt department. *The money they waste would pay for a lifting magnet in a few short months.*

An Ohio lifting magnet is the lowest cost—and fastest—way to make up the charge. Foundry cost records prove this statement. Flexibility? A capable crane operator drops the load piece by piece for "last pound" accuracy.

Save time . . . save money by turning costly man-hours into profitable magnet-minutes. Write to Ohio—*25 years a leader in magnetic materials handling.*

How would you load charging buckets?

SELECT YOUR MAGNET from two Ohio types. The PROTECTO-WELD magnet, shown above, is made in 39, 46, 55 and 65-inch diameters. Bolted construction types include these and other smaller sizes. Ohio also builds magnet control equipment.

5 TYPICAL JOBS WHERE OHIO MAGNETS CUT COSTS

- unloading scrap, rails and pig iron.
- loading charging cars, hoppers and buckets.
- loading and unloading annealing cars.
- moving bulky castings in cleaning dept.
- picking up sprues, gates, runners, overflow.

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Ohio MAGNETS

A-2016

Men OF INDUSTRY

C. C. JARCHOW, formerly vice president, American Steel Foundries, Chicago, has been named president, succeeding **Thomas Drever,** who has become chairman of the board of directors. Mr. Drever served as comptroller of the company from 1910 to 1924, when he became president, the Wahl Co., Chicago. He returned to American Steel Foundries in 1929, as secretary-treasurer, and has been a director since that time. He was named vice president-treasurer in 1932 and president in 1939. He is also chairman of the board of directors, Griffin Wheel Co., Chicago. Mr. Jarchow, the new president, joined American Steel Foundries in 1912, and became comptroller in 1924. He was elected vice president-comptroller in 1943, and has served as a company director since that time. He has been vice president with general executive duties since 1947. Mr. Jarchow is also a director of Griffin Wheel Co., subsidiary of American Steel Foundries. Other officers elected at the annual meeting of the board of directors include, **C. L. Heater, G. H. Snyder, R. D. Brizzolara, James Suttie, C. F. Elmes, A. H. Peycke, C. E. Grigsby, A. J. McDonald, E. A. Walcher Jr.,** and **E. M. Van Winkle,** vice presidents; **O. E. Mount,** secretary-treasurer; **E. C. Rhymer,** assistant secretary-assistant treasurer; and **J. B. Lanterman** controller.

♦ ♦ ♦

Thomas H. Beaulac, for the last 18 years foundry superintendent, Chicago Pneumatic Tool Co., Franklin, Pa., has been appointed sales representative in northwestern Pennsylvania, for the Dayton Oil Co., Dayton, O., with headquarters in Franklin. Mr. Beaulac's previous connections included Worthington Pump & Machinery Corp., Harrison, N. J., Springer Lock & Mfg. Co. Ltd., Belleville, Ont., and Franklin Foundry Co., Franklin, Pa. An active member of the American Foundrymen's Society, he is a past director of its Northwestern Pennsylvania Chapter.

♦ ♦ ♦

James J. Nelson, formerly Philadelphia sales representative, National Bearing Division, American Brake Shoe Co., New York, has been named eastern sales manager of that division, with headquarters in Meadville, Pa. Prior to joining American Brake Shoe Co. Mr. Nelson served as a divisional vice president of Baldwin Locomotive Works, Philadelphia.

♦ ♦ ♦

Changes have been announced in the supervisory staff of the Koehring Co., Milwaukee, manufacturer of heavy-duty construction equipment. **E. A. Brugger,** for the past 10 years general manager of the Parsons Co., Newton, Iowa, a Koehring subsidiary, has been named vice president in charge of production. He has been associated with the company for 32 years. **E. O. Martinson,** who has been general manager of the C. S. Johnson Co., a Koehring subsidiary at Champaign, Ill., has been named chief engineer. **E. W. Maas,** associated with Koehring for 31 years, and since 1946 works manager, has been appointed vice president-general manager, Kwik-Mix Co., the third Koehring subsidiary, in Port Washington, Wis. Vice President **R. A. Beckwith,** since 1940 chief engineer, will devote full time to engineering development work at the parent company and its three subsidiaries. Vice President **F. H. Heine,** since 1946 production manager, and works manager in 1939, will serve as director of foreign operations and utility officer.

♦ ♦ ♦

Elmer Berggren has been appointed machine operations superintendent, Wisconsin Central Foundry Inc., Waukesha, Wis., which has increased its casting facilities. Mr. Berggren's previous connections included Hamilton Standard Propeller Co., East Hartford, Conn., machine shop superintendent of Ampco Metal Inc., and Manufacturers' Equipment Co., both of Milwaukee.

♦ ♦ ♦

William E. Brewster, manager of operations, Wisconsin Steel Division, International Harvester Co., Chicago, has retired. Mr. Brewster, who has been associated with the company's steelworks since 1910, served as assistant general superintendent from 1936 to 1945. He was general superintendent for 2 years prior to his appointment as manager of operations and transfer to general office headquarters in 1947.

♦ ♦ ♦

H. L. Smith has been appointed executive technical engineer, Federated Metals Division, American Smelting & Refining Co., New York, with headquarters in Pittsburgh. Mr. Smith joined the Pittsburgh plant

(*Continued on page* 106)

C. C. JARCHOW

THOMAS DREVER

THOMAS H. BEAULAC

JAMES J. NELSON

It's Simple To Raise Or Control Your Carbon

Pig iron shortage or not, you can forget about the carbon problem when you use Federal Carbon Raiser . . . 8 pounds provide the same carbon content as 100 pounds of pig iron.

Carbon Raiser has other advantages, too . . . foundries melt high scrap (even 100%) without sacrificing casting quality . . . minimum chill, shrinkage and hardness. They gain better control of carbon analysis and reduce range of carbon content fluctuation.

Do as many other foundries are doing—use Federal Carbon Raiser for carbon stabilization or carbon raising. If you prefer ladle addition, buy the fine mesh size—Federal No. 678. Otherwise, specify Federal No. 946.

Use easy-to-use Federal Carbon Raiser for carbon stabilization or carbon increase. Free bulletin available.

FEDERAL NO. 946 CARBON RAISER

FEDERAL DESULPHURIZER BRIQUETTES

- Reduces Sulphur
- Cleanses the Metal
- Faster Melting Rate
- Increases Slag Fluidity

Packed in 100 pound capacity multi-wall paper bags.

Can be added in cupola or furnace.

Melts at 1564° (851°C).

For further details write for free bulletin.

THE FEDERAL TWINS

The Federal Foundry Supply Company

4600 E. 71ST ST., CLEVELAND 5, OHIO

OFFICES IN ALL FOUNDRY CENTERS

(*Continued from page* 104)

of the company 25 years ago as a chemist and has spent the last 10 years as an active field metallurgist working on development and production problems. In his new position he will be assisted by a staff of service engineers and foundry technicians. Mr. Smith has lectured before many metalworking and technical organizations and is the author of a number of papers for the technical press. He is a member of the AFS and other technical organizations.

♦ ♦ ♦

J. T. Phelps has been appointed manager of castings sales, Malleable Iron Fittings Co., Branford, Conn., succeeding **Arthur H. Jameson,** who has retired. **Milton L. Hart** has been named assistant manager of castings sales. Both Messrs. Phelps and Hart have been associated with the company for many years. Mr. Phelps formerly covered the Boston and eastern New England area. Mr. Hart assisted Mr. Jameson at the home office.

♦ ♦ ♦

Ralph M. Johnson, formerly vice president and general sales manager of the abrasive division, Norton Co., Worcester, Mass., has been appointed vice president in charge of sales. In addition to sales of grinding wheels and other abrasive products, Mr. Johnson's duties will now include the sales of abrasive grain and ore, pulpstones, refractories, non-slip floors and all publicity pertaining to these products. He joined the company in 1915 as a research chemist and became successively assistant chief sales engineer, salesman, district manager of the Philadelphia office and warehouse, chief sales engineer and western sales manager. He was made general sales manager, abrasive division, in 1943, vice president in 1945 and became a director of the company in 1946. Mr. Johnson is also a director of the Behr-Manning Co., Troy, N. Y., a Norton affiliate.

ALFRED C. EASTWOOD

Sales representative in the Lake Territory, Tabor Mfg. Co., Philadelphia, who recently moved to Lakewood, O., from Philadelphia as reported in The Foundry, February, p. 102.

♦ ♦ ♦

Harry D. Sweeney has been appointed sales manager of welding products, American Manganese Steel Division, American Brake Shoe Co., New York. Mr. Sweeney, who joined the company in 1945, until recently held the position of sales engineer and will continue to be located at the division's headquarters at Chicago Heights, Ill. Prior to military service he was associated with Acme Steel Co., Chicago.

♦ ♦ ♦

Establishment of several new district sales offices and promotions within the sales organization have been announced by Syntron Co., Homer City, Pa., for sales of its vibrators, vibratory, weigh and screening feeders, conveyors, etc. **W. C. Leasure** of the company's general offices in Homer City, has been appointed district manager of the new sales office in Houston, Tex. **Nelson C. DeVilling,** formerly of the Pittsburgh sales office, has been named district sales manager of the new Dallas, Tex., sales office. **Dick McHale,** formerly in the Chicago office, has been made district sales manager, Los Angeles. **James B. Barth** succeeds **Mr. DeVilling** on the Pittsburgh office sales staff and **G. R. Stocum** takes over Mr. McHale's duties in the Chicago office. **D. E. Nugent** has been appointed to handle power tools sales in the Kansas City, Mo., office.

♦ ♦ ♦

William R. Moore, vice president, Norton Co., Worcester, Mass., has been elected a director of the company. Mr. Moore joined the company in 1914 following graduation from Pennsylvania State College and became successively sales engineer, director of market research and sales manager. He was appointed general sales manager in 1939, and in 1943 became vice president in charge of national accounts and the sale of refractories, abrasive grain and ore, pulpstones, and non-slip floors.

♦ ♦ ♦

O. B. Wilson, formerly eastern regional sales manager, Brown Instruments Division, Minneapolis-Honeywell Regulator Co., Chicago, has been named manager of sales for the east, southeast and central regions, with headquarters at the Brown plant in Philadelphia. Mr. Wilson, who has been associated with the industrial instruments division of Honeywell for the past 25 years, will supervise sales in the area extending from Florida and the Gulf of Mexico to the Canadian border.

♦ ♦ ♦

Robert G. Fries and **George Brannick Jr.** have been appointed engineers on the technical staff of Sterling Grinding Wheel Division, Cleveland

(*Continued on page* 110)

J. T. PHELPS

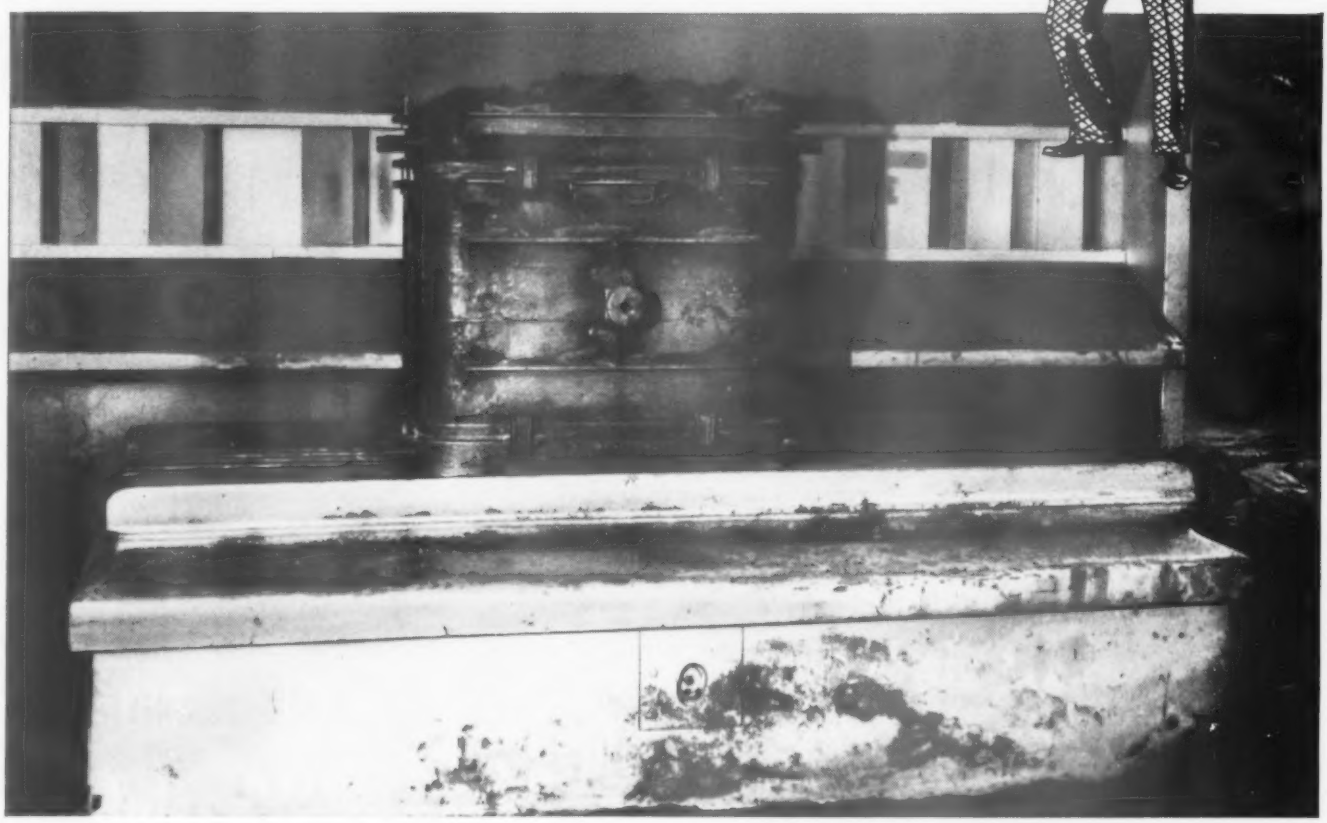
MILTON L. HART

ARTHUR H. JAMESON

RALPH M. JOHNSON

You can tell the difference

. . . with your eyes shut!



The Robins Floatex Shakeout shakes the flask—not the building

You don't have to look at the name to recognize a Robins Floatex Shakeout when it's running.

The mere fact that you don't feel the building shake tells you at once that it's a Robins. And therein lies the big basic difference between a Robins Floatex and any ordinary shakeout!

No shaking effort is wasted with a Robins Floatex Shakeout. It shakes the flask—not the building! This is because it is the only *full-floating* foundry shakeout. The live frame and load *both* ride on big coil springs.

Naturally, you'd expect this full-floating principle to save wear and maintenance expense. And users' records prove that it does.

A Robins Floatex Shakeout offers you many other important money-saving features, too. For example, you can use it to knock out cores . . . right in the same operation with your flask shakeout!

Why not let a Robins engineer explain how the Robins Floatex Shakeout can make a big difference in *your* foundry output? Write Robins Conveyors Division today.

SEND TODAY for Bulletin 124-B. Gives you a complete picture story of benefits you enjoy with portable, stationary or self-discharging Robins Floatex Shakeout. Write Robins Conveyors Division, 270 Passaic Ave., Passaic, N. J.

ROBINS

FLOATEX SHAKEOUT

ROBINS CONVEYORS DIVISION **HEWITT-ROBINS INCORPORATED**

Cut Cleaning Costs

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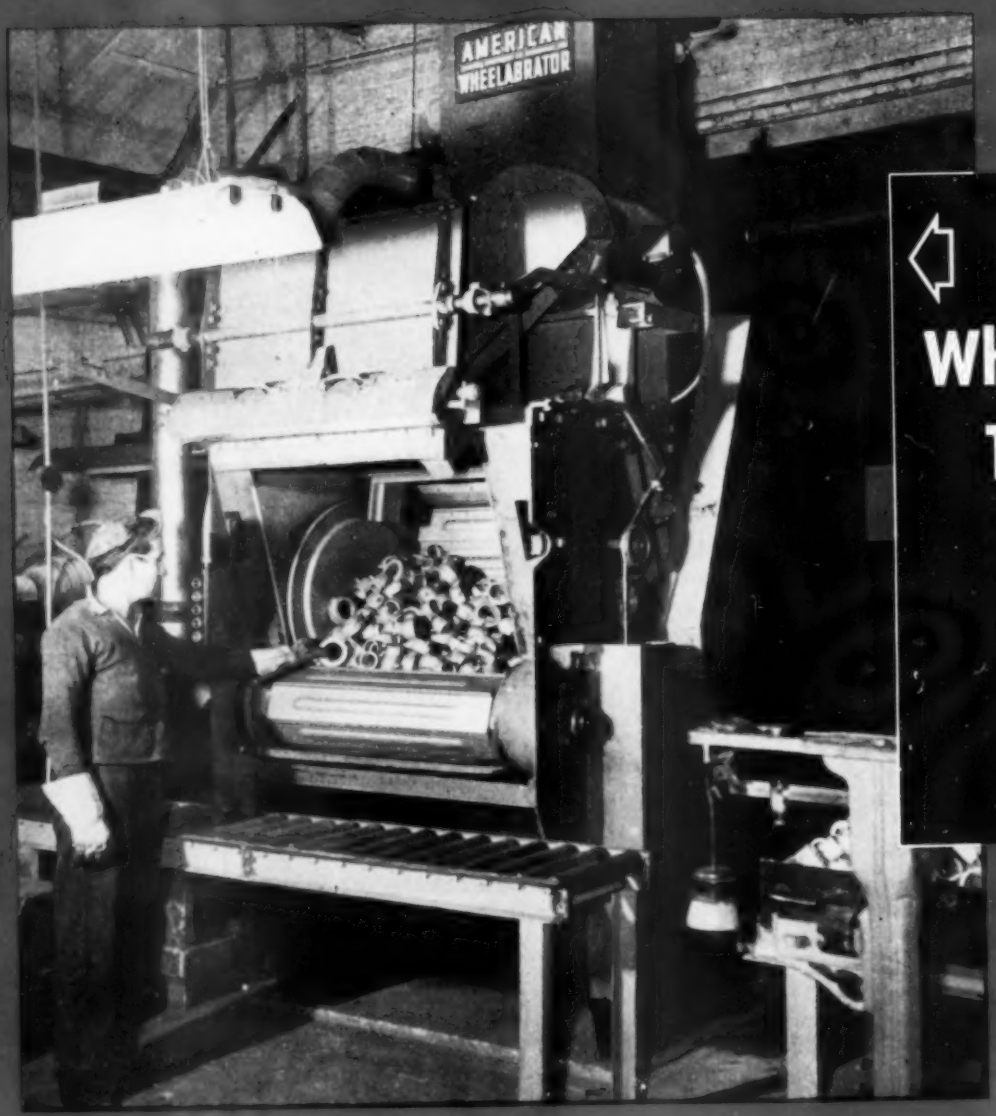

This Wheelabrator Tumblast Cut Cost 59.3% per ton

Cleans brass, bronze and aluminum castings for fire protection equipment weighing from 1 oz. to 50 lbs. each.

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INCREASE TONNAGE

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performance at ELKHART BRASS MFG. CO. returned investment in 27 months

FORMER METHOD	WHEELABRATOR METHOD
EQUIPMENT 1 Airblast Barrel 2 Wet Tumblers	**EQUIPMENT** 27" x 36" Wheelabrator Tumblast (5 cu. ft. capacity)
PRODUCTION 4 tons in 8 hours	**PRODUCTION** 5½ tons in 4 hours
LABOR 16 man hours	**LABOR** 4 man hours
CLEANING COSTS Daily $14.92 Per Ton $3.73	**CLEANING COSTS** Daily $8.36 Per Ton $1.52

SAVINGS

DAILY $6.56 YEARLY $1,705.60

TOOL LIFE INCREASED due to complete removal of burnt-in sand and scale.

LABOR: 75% saving in cleaning labor.

FASTER INSPECTION—because surface defects can be detected readily.

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New, informative book gives complete, concise information on all phases of airless blast cleaning. Write today for Catalog No. 74.

(*Continued from page* 106)

Quarries Co., Tiffin, O., to work in the laboratory under the company's research and development program. **John B. Riddle** has been appointed plant engineer. Mr. Fries formerly was associated with the Carborundum Co., Niagara Falls, N. Y. Mr. Brannick was formerly in charge of resin development and research, Continental Diamond Fibre Co., Bridgeport, Pa. Mr. Riddle has been material handling and method engineer, Lincoln-Mercury Division, Ford Motor Co.

♦ ♦ ♦

J. H. W. Conklin, sales manager, Industrial Truck Division, Clark Equipment Co., Battle Creek, Mich., was elected president of the Materials Handling Institute at the recent annual meeting in Philadelphia, succeeding **S. W. Gibb,** sales manager, Yale & Towne Mfg. Co., Philadelphia. Other officers elected for 1949 include: **J. G. Bucuss,** Acme Steel Co., Chicago, first vice president; **J. P. Lawrence,** American MonoRail Co., Cleveland, second vice president; and **R. Kennedy Hanson,** Secretary-treasurer.

♦ ♦ ♦

Lawrence J. Holzman, formerly vice president, Parsons Engineering Corp., Cleveland has been named president and general manager, the Mutiplex Concrete Machinery Co., Elmore, O. Widely known in the foundry industry, Mr. Holzman has designed many dust control systems. **Frank Muenzer,** who has been associated with the company for several years, has been appointed vice president in charge of research and development.

♦ ♦ ♦

Clarence R. Studer, district sales engineer, has been put in charge of the new St. Louis, Mo., office recently opened by Chain Belt Co., Milwaukee. Mr. Studer a graduate of Washington State College, has handled the products of Chain Belt Co. in the St. Louis area for 4 years. Prior to that he spent 19 years in the power and transmission field with General Electric Co., as application and sales engineer. **David B. Hill** has been named to manage the new Jacksonville, Fla., office of the company. Mr. Hill was graduated from Clemson College with a degree in mechanical and electrical engineering. He joined Chain Belt Co. in 1937 and was district sales engineer in its Chicago and Atlanta offices prior to his recent appointment. Prior to that he had over 25 years of experience in design, installation, service and sales in the conveyor and related fields.

♦ ♦ ♦

Dr. Edwin W. Tillotson, assistant director, Mellon Institute of Industrial Research, Pittsburgh, has been selected as the 1949 recipient of the Bleininger Memorial Award of the American Ceramic Society for distinguished achievement in the field of ceramics. The award will be presented Mar. 11 at Hotel Schenley, Pittsburgh. For many years Dr. Tillotson has been in supervisory charge of all Mellon Institute investigations in ceramic and related fields.

♦ ♦ ♦

Carl E. Von Luhrte, sales manager, western division of Chicago Retort & Fire Brick Co., Chicago, has been made director of sales of that company. **Robert P. Stevens,** formerly sales manager, eastern division, has been named sales manager.

♦ ♦ ♦

John A. Seubert, executive vice president of the Estate Heatrola Division, Noma Electric Corp. of Maryland, Hamilton, O., is retiring and **Cecil M. Dunn** has been named general manager of the division.

Robert D. Dodge has been appointed a sales representative in the Michigan area, Core Oil Division, The Werner G. Smith Co., Division of Archer-Daniels-Midland Co., Cleveland. Mr. Dodge attended Michigan State University and was associated with Ford Motor Co. prior to his new appointment. He has recently completed the training program conducted by the company in its foundry research laboratory, Minneapolis. He will work under his father, **Frank H. Dodge,** who has represented the company in Michigan for the last 33 years.

♦ ♦ ♦

Dr. Mary Baeyertz has been named assistant chairman of the Metals Research Dept., Armour Research Foundation, Illinois Institute of Technology, Chicago. Dr. Baeyertz has been senior metallurgist with the foundation since 1947. Previously she was supervisor of research at the South Chicago works, Carnegie-Illinois Steel Corp. She was graduated from Smith College and received her master's and doctor's degrees from Columbia University.

♦ ♦ ♦

Glenn C. Shively has been appointed purchasing agent, Superior Steel & Malleable Castings Co., Benton Harbor, Mich.

♦ ♦ ♦

Harold W. Wyatt, formerly research engineer, Lunkenheimer Co., Cincinnati, has been named head of the physical laboratory of the metallurgical division of the company.

♦ ♦ ♦

Robert E. Barnett has joined the Research and Development Laboratories, Sam Tour & Co. Inc., New York, where he will specialize in air pollution studies for application to industrial plants. Mr. Barnett, who has

(*Concluded on page* 112)

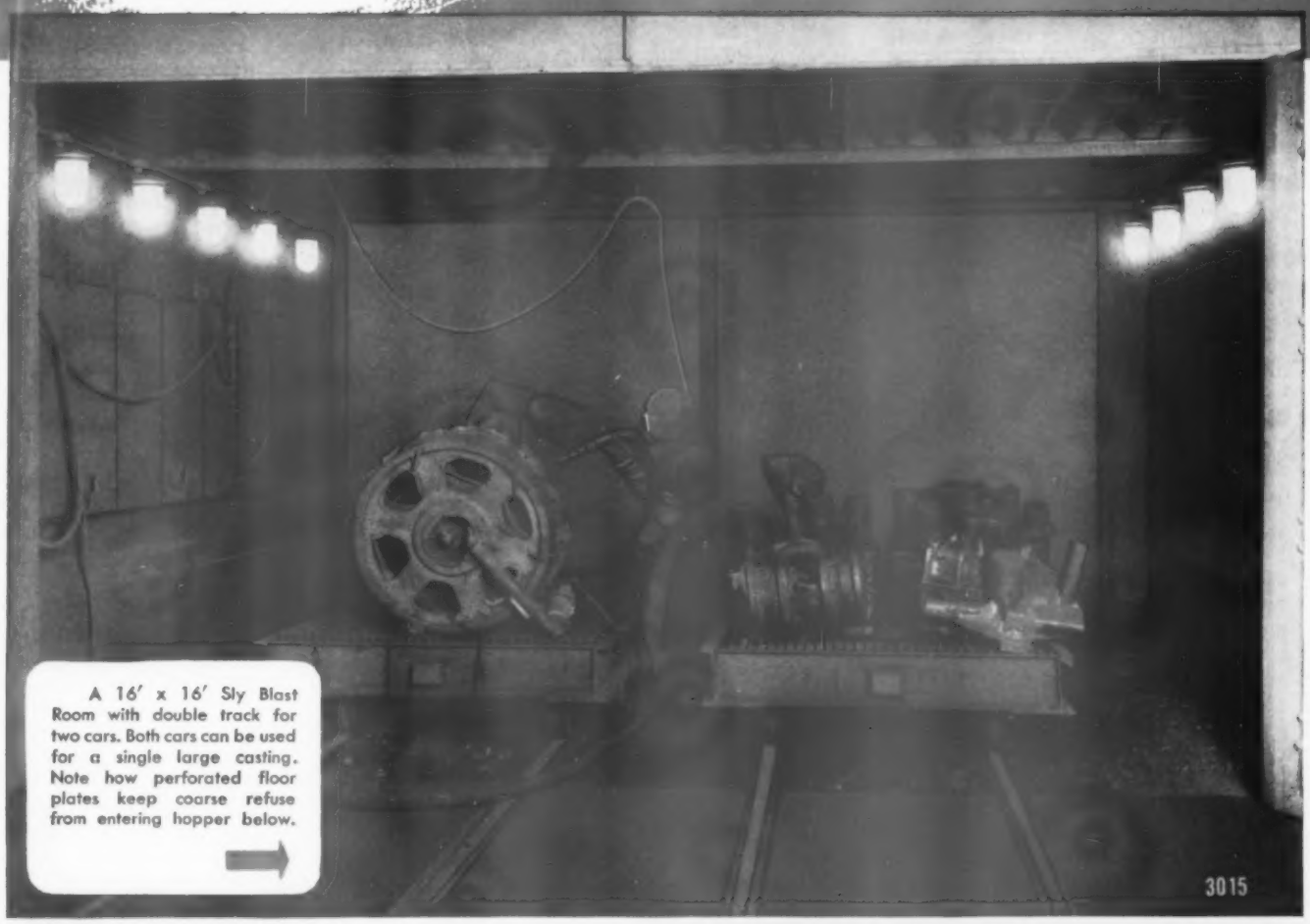
J. H. W. CONKLIN

LAWRENCE J. HOLZMAN

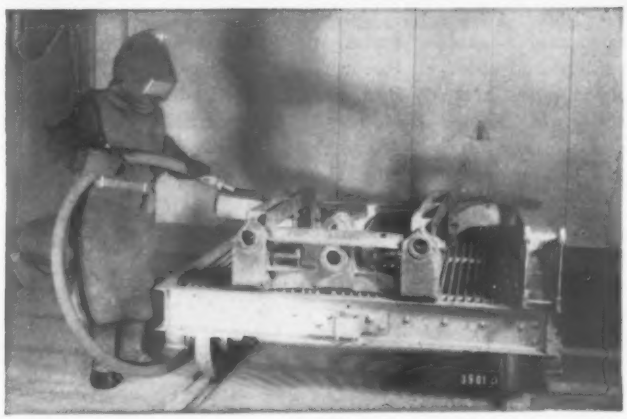
CLARENCE R. STUDER

DAVID B. HILL

SLY ARMOURED* BLAST ROOMS



A 16′ x 16′ Sly Blast Room with double track for two cars. Both cars can be used for a single large casting. Note how perforated floor plates keep coarse refuse from entering hopper below.



This view shows a Sly Blast Car in a Sly Blast Room. Perforated floor plates are supported by grating preventing plates from warping. Observe how tops of rails are flush with floor. Operator wears a Sly "Purair" Helmet.

Whatever Size Your Castings

And whatever your tonnage we have a standard blast room to suit. We have built blast room equipment for the cleaning of the inside of tank cars, for large airplane fuselages, for structural assemblies, tanks, railroad cars and locomotives. Some large blast rooms are self-contained buildings.

Standard Sly Blast Rooms

Inside Width: 8 ft., 10 ft., 12 ft., 14 ft., 16 ft.
Inside Length: 8 ft., 10 ft., 12 ft., 14 ft., 16 ft.
Inside Height: 7 ft. 3 in., 8 ft. 3 in., 9 ft. 3 in.
Larger Blast Rooms for special purposes.

***ARMOURED** { **An extra layer of detachable 3/16" steel wear plates to protect the walls.**
An extra layer of steel grating to reinforce the floor against sagging.
(Exclusive Sly features)

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Toronto • Minneapolis • Cincinnati • Rochester • Los Angeles • Birmingham

(*Concluded from page* 110)

been chief of the chemical test branch, Army Chemical Center, Edgewood Arsenal, Ind., has had extensive experience in atmospheric sampling and analysis.

♦ ♦ ♦

J. T. Jones, until recently associated with the open-hearth department, Republic Steel Corp., South Chicago, Ill., has joined the sales force of Vesuvius Crucible Co., Pittsburgh, producer of crucibles and graphite stopper heads.

♦ ♦ ♦

L. W. Follett has been named a member of the board of directors, Davenport Machine & Foundry Co., Davenport, Iowa. Mr. Follett, who joined the company in 1934 as chief engineer, has had a wide experience in the foundry molding machine industry. Prior to that he was in the experimental department of John Deere Harvester Works, East Moline, Ill., and was also associated with Wallworth Co., New York.

♦ ♦ ♦

Edward E. Hook has been appointed eastern sales manager, Dayton Oil Co., Dayton, O., with headquarters in Syracuse, N. Y. Prior to joining the company in 1943, Mr. Hook spent 31 years in the foundry industry, with American Radiator & Standard Sanitary Corp., Buffalo, and Pierce Butler Radiator Corp., Syracuse, N. Y. He served as chairman of the Central New York Chapter of the American Foundrymen's Society in 1946-47 and is at present one of its directors.

♦ ♦ ♦

Charles Morrison, who resigned in 1946 from Central Foundry Divison, General Motors Corp., as chief metallurgist of its Saginaw Malleable Plant, currently is engaged in consulting work for Benton Harbor Malleable Industries, Benton Harbor, Mich. For the last two years he has been building and developing Caribou Lodge, a fishing resort near Iron Bridge, Ontario, Canada, which he plans to operate from May 1 to Oct. 1 each year, and to do consulting work the other seven months. Mr. Morrison, who has had many years experience in the production of malleable iron, gray iron and electric steel, attended Ripon College and did postgraduate work at University of Michigan and General Motors Institute of Technology. He was associated with Buick Motor Division's metallurgical laboratories from 1924 to 1926, when he was transferred to the Saginaw Malleable Iron Divison. The ensuing 20 years he served successively as chief chemist, assistant metallurgist, coreroom superintendent, annealing room superintendent, sales engineer, plant metallurgist and chief metallurgist. One of the founders of the Saginaw Valley Chapter, American Foundrymen's Society, Mr. Morrison was named its first chairman in 1945.

♦ ♦ ♦

Richard Ludwig has been named superintendent of processing at the newly opened Danville, Ill., plant of the Central Foundry Div., General Motors Corp. **Glenn Tuttle** has been appointed head of the inspection department; **Robert Fagaly,** plant engineer; **Fred Matzelle,** superintendent of maintenance; and **Laurence B. Freeburn,** personnel director.

♦ ♦ ♦

J. K. Louden has been elected vice president and assistant to the president, the York Corp., York, Pa. **J. G. Bergdoll** has been named vice president and works manager and **J. C. Consley,** vice president and chief engineer. **William F. Lynne** has been made assistant controller. Mr. Louden joined the company about six months ago as assistant to the president. Mr. Bergdoll has been with the organization and its associates for more than 28 years. Mr. Consley, associated with the York Corp. for more than 24 years, has spent 5 years in charge of the engineering division.

♦ ♦ ♦

Oscar Blohm, owner, secretary and treasurer, Triangle Foundry Co., 4537 W. Patterson Ave., Chicago, sold the property recently and has established practice as a foundry consultant on metallurgical, management and molding problems. His headquarters are at 416 S. Kenilworth Ave., Oak Park, Ill. Mr. Blohm was formerly chief metallurgist, Hills-McCanna Co., Chicago.

♦ ♦ ♦

J. H. Gardner, formerly associated with Marshall Furnace Co., Marshall, Mich., has been appointed vice president in charge of sales, Oakland Foundry & Machine Co., Rochester, Mich., subsidiary, Detroit Gray Iron Foundry Co., Detroit.

♦ ♦ ♦

Bernard A. Annis, for the past three years foundry engineer, Lester B. Knight & Associates, Chicago, and for 18 months prior to that an engineer, Beardsley & Piper Co., Chicago, is now associated with Hydro-Blast Corp., Chicago, as foundry sales engineer.

♦ ♦ ♦

Otto A. Pfaff, president, American Wheelabrator & Equipment Corp., Mishawaka, Ind., has been named a director of Signode Steel Strapping Co., Chicago.

♦ ♦ ♦

Carl E. Von Luhrte, formerly sales manager, Western Division, Chicago Retort & Fire Brick Co., Chicago, has been named director of sales. **Robert P. Stevens** has been promoted from sales manager, Eastern Division, to sales manager.

J. T. JONES

L. W. FOLLETT

EDWARD E. HOOK

CHARLES MORRISON

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Foundry Sessions at Western Congress

Prof. James Cady, University of Southern California, and Kenneth L. Clark, International Nickel Co., Los Angeles, are serving as co-chairmen in arranging the American Foundrymen's Society's program to be presented in conjunction with the Western Metal Congress and Exposition, Apr. 11 through 15, at Shrine Convention Hall, Los Angeles.

They were appointed by Leonard O. Hoffstetter, Brumley Donaldson Co., and Earle D. Shomaker, Kay-Brunner Steel Products Inc., chairman and vice chairman, respectively, of the Southern California Chapter of the AFS.

Two full sessions will be presented. One is scheduled for the evening of Apr. 13, and the other will be held the afternoon of Apr. 14.

Simultaneously with the AFS sessions and on other afternoons and nights, programs will be given by American Society for Metals, American Welding Society and American Institute of Mining and Metallurgical Engineers.

More than 200 nationally known firms will be represented with displays demonstrating what is new or improved in metals, welding supplies and equipment, heat treating equipment and service, foundry supplies, inspecting and testing aids, materials handling, metal cutting, machining equipment and tools.

Throughout, the joint event is designed as a Salute to the Metal Industries of the West. Special attention will be paid to metals for oil, chemical, general manufacturing, aviation and mining production.

The technical sessions and show will be presented for the sixth time on the Pacific Coast. William H. Eisenman, secretary, ASM, has established offices at 3232 Royal St., Los Angeles.

Officers Named by Steel Founders

Thomas H. Shartle, Texas Electric Steel Casting Co., Houston, Tex., has been elected president of the Steel Founders' Society of America. New vice president of the society is G. Clymer Brooke, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.

Mr. Shartle presided at the society's annual meeting held at the Edgewater Beach Hotel, Chicago, Feb. 9-10. One of the high lights of the meeting was the annual presentation of the SFSA medals for outstanding service to the organization and the steel casting industry. F. Kermit Donaldson, vice president and general manager, the Machined Steel Casting Co., Alliance, O., and immediate past president of the society, was presented the Lorenz Medal. The Technical and Operating Medal was awarded to R. A. Gezelius, General Steel Castings Corp., Eddystone, Pa.

A complete report on the annual meeting will be presented next month.

Foundry Installs New Employee Locker Room

NEW locker and toilet room centrally located to serve all male employees of the Foundry Division of Erie Malleable Iron Co., Erie, Pa., supersedes five departmental and less adequate facilities. Construction is concrete and steel on a second floor, providing approximately 4400 sq ft of floor area. Floors are of quarry tile and walls are of green structural tile with the north wall partly in glass block, affording some natural illumination supplemented by modern lighting fixtures.

Equipment includes 350 lockers, 12 x 18 in. x 6 ft high, mounted on masonry curbs and with sloping tops for cleanliness. Permanently installed pedestal benches are mounted between the rows of lockers. Steel-partitioned toilets and wash basins with concealed plumbing are provided.

Individual slate showers, separately drained, are equipped with the latest type hardware including an antiscald device, and a dry room with towel hooks and benches is adjacent. Heating and forced draft ventilation are thermostatically controlled to provide uniform temperature, winter and summer.

Other facilities include vacuum hose connections for locker cleaning, refuse chute, subway-grating on staircases to scrape off dirt adhering to shoes, and free laundry service for personnel.

Offers Course in Leadership

A five-lesson course entitled "Leadership" has been prepared for supervisory employees in industry by International Correspondence Schools, Scranton, Pa. The unit lessons are now included as a regular part of all the school's management courses and are also being used in themselves by management in training foremen groups.

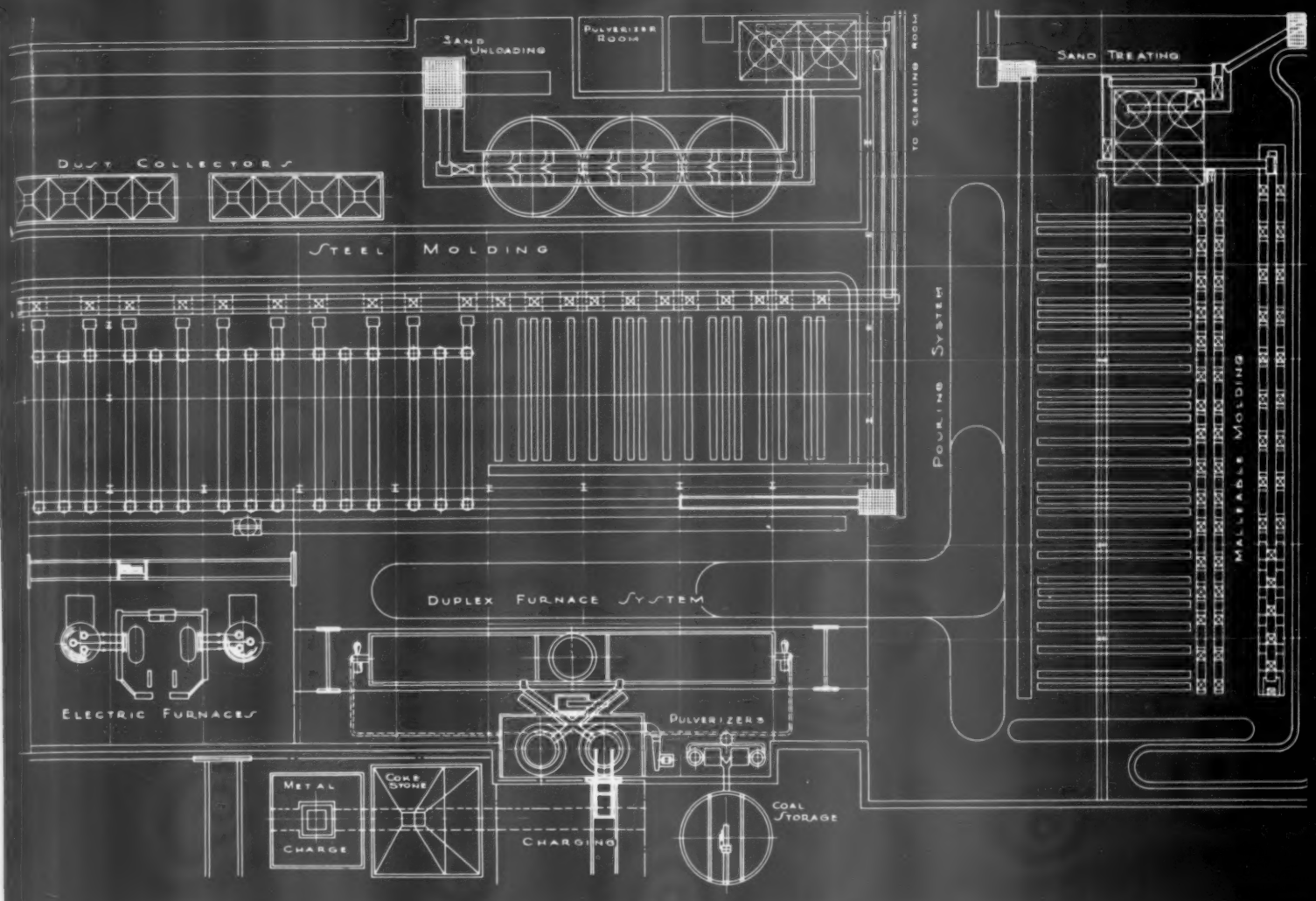
Scope of the course is indicated by the titles of the individual discussions which are: "Leadership and Free Enterprise," "Leadership and Output," "Leadership and the Workers," "Leadership and Organized Labor," "Leadership and the Organization."

Book Review

F. B. I. Register of British Manufacturers, published for the Federation of British Industries by Kelly's Directories Ltd. and Iliffe & Sons Ltd., Dorset House, Stamford St., London S.E. 1, England. Cloth, 752 pages, 7⅛ x 9½ in. Price, including overseas postage, 43s 6d.

This 21st edition of the register comprises information about nearly 6000 British manufacturers and their products. It includes a classified "products and services" section listing Federation of British Industries members' goods and services under

(*Concluded on page* 117)



As professional engineering consultants we furnish complete designs, with construction and detailed plans for the necessary facilities to bring present plants to a high degree of modern operation by newest techniques, or similarly, a new plant with balanced intra expandability, tailored to fit your individual needs.

Equalizing, in some manner, the high individual wage of foundry labor is becoming increasingly more urgent. This equilibrium plus improved net earnings is obtained thru mechanical means to do the hard work of foundry production. Concentration of floor area with its greater ease in management is an additional advantage in cost reduction. A preliminary discussion and examination at the plant site will be made without obligation.

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(*Concluded from page* 114)

more than 5000 trade headings, facilitating rapid identification of supply sources.

An "addresses" section contains a directory of all FBI addresses, overseas agents and other information useful to buyers. A "brand names" and "trade marks" section is included to facilitate the finding of goods of which only the brand names or trade marks are known.

Directory sections are printed in English, but "how-to-use" notices in French and Spanish are included.

New Films Released By Safety Council

A new series of six sound slide films, entitled "Human Factors in Safety," has been released by the National Safety Council to aid management's foreman training program. The 35 mm., 33-1/3 rpm films comprise a visual training course for foreman that deals with production and job attitudes, as well as safety.

The cartoon technique is used in two of the films, and action shots of workers on the job add realism to the plant scenes. The narration is by professional radio announcers. Each film deals with one aspect of the complex art of handling people. The six films are entitled, "The Secret of Supervision," "Teaching Safety on the Job," "People Are All Alike," "Everybody' Different," "Teamwork for Safety," and "Safety Case Histories."

Further information can be obtained from the National Safety Council, 20 North Wacker Drive, Chicago 6.

FEF Elects Sixth Founding Member

Steel Founders' Society of America has joined the Foundry Educational Foundation as one of the latter's founding members, it has been announced by Peter E. Rentschler, foundation president and president of the Hamilton Foundry & Machine Co., Hamilton, O.

Formal election of the society to foundation membership took place Jan. 27 at a meeting of FEF trustees held at the Massachusetts Institute of Technology, Cambridge Mass.

As its representatives in the foundation, the Steel Founders' Society has named H. F. Tielke, Crucible Steel Casting Co., Cleveland, and T. F. Dorsey, Fort Pitt Steel Casting Division, Pittsburgh Steel Foundry Corp., McKeesport, Pa. Mr. Tielke is chairman of the Steel Founders' education committee.

Founding members of the Foundry Educational Foundation now include, in addition to the Steel Founders' Society, the Gray Iron Founders' Society, the Malleable Founders' Society, the American Foundrymen's Society, the Foundry Equipment Manufacturers' Association and the Non-Ferrous Founders' Society.

Milwaukee Journal photo

CONFERENCE LEADERS: Active in arrangements for the recent successful Regional Foundry Conference held in Milwaukee under sponsorship of the Wisconsin Chapter of the AFS and the University of Wisconsin were these chapter officers. Left to right they are Robert C. Woodward, Bucyrus-Erie Co., chapter president; George E. Tisdale, Zenith Foundry Co., chapter treasurer and general program chairman for the conference, and A. C. Haack, conference chairman

High School Students Attend FEF Meeting

FORTY-eight students and faculty members from three high schools in the Hamilton, Ohio, area attended the Foundry Educational Foundation meeting, Jan. 18, at University of Cincinnati. Nearly 200 students from southwestern Ohio schools attended the meeting.

Speakers at the meeting were R. J. Redmond, chairman of the meeting and of the University of Cincinnati FEF Advisory Committee; Joesph D. Judge, chief engineer, Hamilton Foundry & Machine Co., Hamilton, O.; Dr. C. A. Joeger, dean of College of Engineering, University of Cincinnati; Prof. R. A. Van Wye, co-ordinator, School of Chemical and Metallurgical Engineering, and Prof. John Kahles, University of Cincinnati.

Also on the program were the introduction of FEF and University officials, showing of a motion picture furnished by Cincinnati Milling Machine Co. and a tour of the metallurgical laboratories.

Training Boys for the Foundry

(*Continued from page* 82)

for this major field of employment.

In September, 1946, vocational education officials of the school system first urged the renewal of this training program. Representatives of the Board of Education responded by requesting Robert Mason, executive secretary of the Muskegon Manufacturers' Association, to form a committee among the foundry industrial group within this association's membership, together with other foundries in nearby communities, to determine what might be done about instituting a foundry section in the school. This group was organized and immediately appointed a subcommittee from the member companies' engineering departments to prepare a plan and estimate the cost of rehabilitation.

Plans for a modern layout were prepared in line with the advancements made in the foundry industry the last 50 years. It was also recommended that safety and cleanliness in the foundry be stressed—for example, a brick surface to be laid over the old floor; a modern washroom, including showers and lockers; safety equipment, including goggles, leggings, safety shoes, gloves and asbestos aprons for furnace work. Suggested mechanical equipment included an electric melting furnace to provide actual casting demonstrations daily, molding machines, shot blast cleaning and grinding units, modern molding benches with complete tools for each student, and mechanical sand mixing equipment. A laboratory complete with sand testing instruments also was recommended.

The subcommittee submitted with its plans an itemized estimate calling for the expenditure of approximately $20,000 to purchase and install the necessary equipment.

Following the acceptance of the engineering subcommittee's plan and cost estimate, a separate Donors Group was organized, independent of the Manufacturers' Association. This group consisted of executives of local foundries and such related industries as pattern shops, equipment manufacturers, foundry supply dealers, scrap dealers, building and steel fabricating organizations and trucking firms, all of whom participated in raising the required fund. School executives were appointed to the group to speed up the exchange of information between the school and industry.

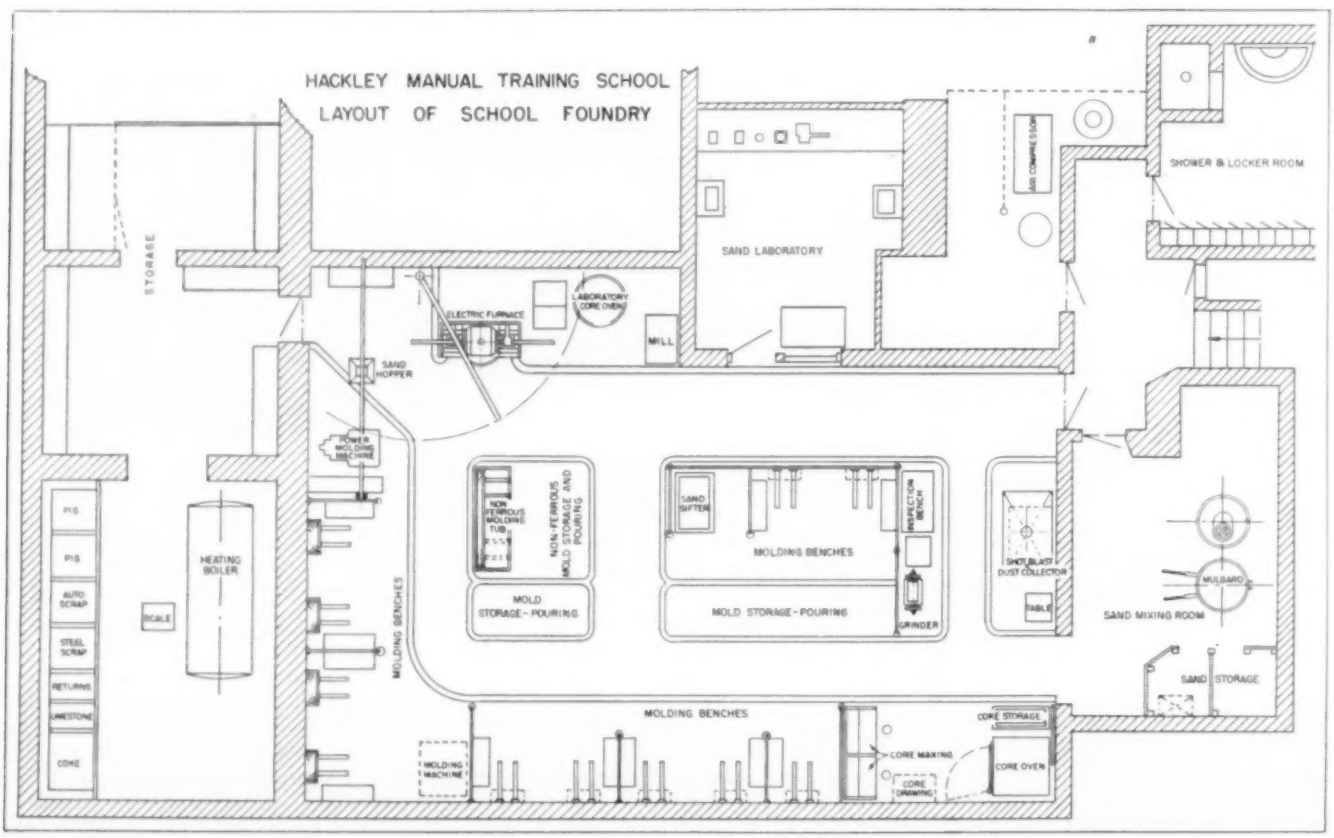
Personnel of the Donors Committee, which represented the more than 50 contributors to the fund, is as follows: Chairman, George W. Cannon, board chairman, Campbell, Wyant & Cannon Foundry Co.; R. J. Mason, secretary-treasurer, Muskegon Manufacturers' Association; J. O. Ostergren, president, Lakey Foundry & Machine Co.; Adam Pyle Jr., secretary-treasurer, Pyle Pattern & Mfg. Co.; O. A. Seyferth, president, West Michigan Steel Foundry Co.; Paul M. Wiener, president, Paul M. Wiener Foundry Co.; Richard B. Warren, assistant superintendent of schools, Muskegon; Edward Huttenga, director of vocational training, Muskegon.

Approved by Board of Education

The comprehensive outline of the foundry rehabilitation project, specifying the contributions of the Donors Group, was then presented by the group to the Muskegon Board of Education. It was approved by the board, which agreed to prepare the building and install the necessary equipment as specified by the Donors Group.

One of the most important tasks undertaken by the Donors Committee was in aiding the school authorities to secure a competent instructor who would combine apprentice and journeyman foundry experience with training in vocational teaching. Arrangements were finally completed to engage Adrian J. Archambault as

(*Continued on page* 120)



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(*Continued from page* 118)

manager-instructor of the foundry section. Mr. Archambault qualified for the job in view of his four-year apprenticeship, eight years' journeyman experience and seven years as a circuit foundry instructor for the Wisconsin State Board of Vocational and Adult Education. He has now been approved by the state of Michigan Office of Vocational Education.

Layout of the new foundry is shown in an accompanying illustration, with principal equipment indicated. The rocking type electric furnace has a 60-pound charge capacity, 100 pounds molten metal capacity, and is provided with an extra shell for nonferrous metals and a jib crane to handle ladles. The air compressor will furnish 142 cfm at 100 pounds pressure. Equipment for cleaning castings includes a double-spindle floor stand grinder complete with dust collector and a shot blast cabinet and dust collector.

Sand is prepared in a portable type muller of 3½ cubic feet capacity per batch. A small laboratory type mixer also is available. Coremaking benches are located adjacent to a shelf type gas-fired oven and racks for core storage. A well equipped sand laboratory includes such facilities as sieve shaker with timer, balance, sand specimen dryer, moisture teller, sand rammer, sieves and motor-driven sand strength tester.

Molding equipment comprises two machines—one mechanical, the other hand operated—and 11 molding benches completely equipped with all of the necessary tools of the trade. A feature of these benches is an apron under each one to prevent the piling up of sand which would be difficult for the operators to remove at the end of the class. Plenty of brooms are available and good housekeeping throughout the foundry is emphasized. Cope and drag flasks of the pop-off type and jackets are provided in a variety of sizes.

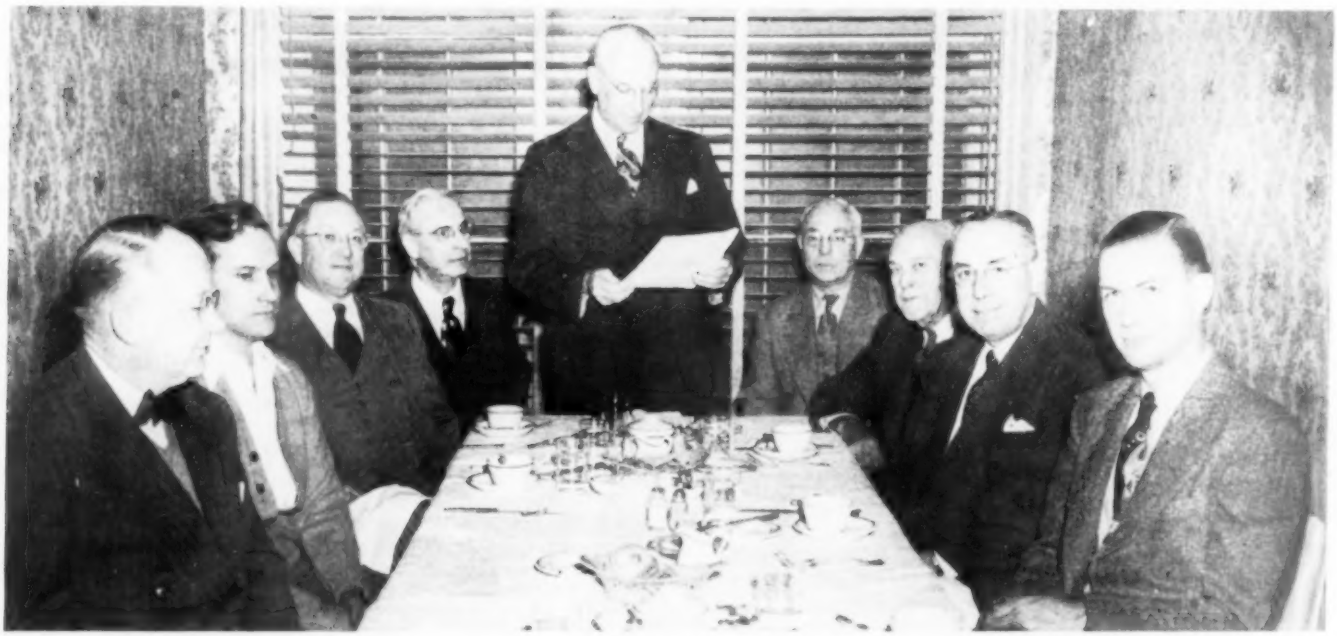
Walls of the foundry are finished in an attractive color scheme, while the combination of ample window area and artificial lighting gives highly efficient illumination. The modern wash and locker room is comparable to the best in industry, except in size.

In order to continue the co-operative supervision of the school's foundry by experienced foundry personnel, the Western Michigan Chapter of the American Foundrymen's Society was asked to provide special advisory subcommittees after the Donors Committee had completed its work. These subcommittees consist of two or three members each and their duties are to render assistance or advice to the manager-instructor as required. Subcommittee members will be named for varying lengths of terms so that service of an experienced member will be continuous.

These subcommittees have been appointed to serve in each of the following classifications of foundry operations: General; sand and sand mixing; sand laboratory; coremaking; molding; patterns; melting and pour-

(*Concluded on page* 123)

GEORGE W. CANNON, who, as chairman of the Donors Group, played a prominent part in the successful carrying out of the plan to stimulate foundry training in Muskegon, has long been actively interested in furthering the general advancement of the foundry industry. He was born in Springfield, Ill., in 1883, and after serving as an apprentice and journeyman in Chicago foundries, formed a partnership in 1905 with Donald J. Campbell and Ira A. Wyant. The Campbell, Wyant & Cannon Foundry Co. was established in Muskegon in 1908, with Mr. Cannon as vice president. Subsequently he served as president and is now chairman of the board. Mr. Cannon is a past director of the American Foundrymen's Society.



DONORS COMMITTEE: Representing the more than fifty foundry and related industry companies who were instrumental in rehabilitating Muskegon's foundry training center was a Donors Committee. Shown here at one of the committee meetings are, left to right: Lyman G. Thunfors, Paul M. Wiener Foundry Co.; James Seyferth, West Michigan Steel Foundry Co.; Erwin Jones, Lakey Foundry & Machine Co.; Robert J. Mason, Muskegon Manufacturers' Association; George W. Cannon, Campbell, Wyant & Cannon Foundry Co.; Adam Pyle Jr., Pyle Pattern & Mfg. Co.; E. W. Beach, Campbell, Wyant & Cannon Foundry Co.; C. W. Bemer and Richard B. Warren, Muskegon Public Schools

They're built for **HARD WORK**

No matter what your casting requirements, or the conditions of handling, there's a Shanafelt Flask for your job. The one man Flask, made of aluminum, weighs only 8 pounds. The large section —a special heavy duty construction—weighs over two tons for the set.

One production foundry reports using a group of Shanafelt Flasks seven days a week, pouring each flask 12 times every 24 hours.

Week after week these flasks make 84 trips over the shakeout—then right back on the line pouring good castings. That kind of equipment soon pays for itself.

A representative will gladly call to discuss your requirements, or just send us specifications of the flask equipment you want. Estimates of cost and delivery will be submitted promptly.

The **SHANAFELT** *Manufacturing Co.*

ESTABLISHED 1893 • 2600-2700 WINFIELD WAY, N. E. • CANTON, OHIO

SEAL TYTE CHAPLETS • STEEL FOUNDRY FLASKS • FLASK PINS AND BUSHINGS

"Your Foundry Flasks Are Precision Tools"

. . . and every step along its huge assembly line, B S & B is meticulous in its effort to provide you with the finest. Welding, hydraulic truing, grinding and drilling of pinlugs (top to bottom) are done by experts. Again and again, each flask is inspected to insure perfect compliance with specifications.

BS & B's Exacting Workmanship Assures Accurate, Reliable Performance

Why take chances? Inexperienced, haphazard methods of flask manufacture can cost you money, waste time, create trouble.

Black, Sivalls & Bryson pioneered the development of welded steel foundry flasks. B S & B originated the steel-bushed flask. Foundrymen of long experience make B S & B flasks. Craftsmen employing the most modern machines and techniques carry out your orders. All types and sizes can be fabricated in the vast B S & B plant. Yet these great advantages cost you no more.

In these days of delay, you'll be pleased with the speed that B S & B fills your order. Write or wire today for full information. B S & B engineers and planners will be happy to help you with your problems.

BLACK, SIVALLS & BRYSON, INC.
Special Products Division
Power and Light Building Kansas City 6, Mo.

Any shape, any size flask for any purpose . . . built to your order by men who know the foundry!

AUTHORIZED BS&B DISTRIBUTOR

ORDER TODAY!
GET GOOD DELIVER
Distributors All Over the
Nation Ready to Serve Yo

BIRMINGHAM, ALA.
Foundry Service Co.

BOSTON, MASS.
Klein-Farris Co., Inc.

BUFFALO, N. Y.
Queen City Sand & Supply Co.

CHICAGO, ILL.
S. Obermayer Co.

CINCINNATI, O.
Hill and Griffith Co.
S. Obermayer Co.

CLEVELAND, O.
C. L. Nash

DAYTON, O.
Fenton Foundry Sup. Co.

DETROIT, MICH.
Wolverine Foundry Sup. Co.
E. J. Woodison Co.

EDWARDSVILLE, ILL.
Midwest Foundry Sup. Co.

ELMIRA, N. Y.
F. F. Shortsleeve Co.

FT. WORTH, TEX.
Ralph A. Carlson

LOS ANGELES, CALIF.
Independent Foundry Supply Co.

MINNEAPOLIS, MINN.
Foundry Supply Co. Inc.

MONTREAL, CAN.
Canadian Foundry Sup. & Equipme Ltd.

OAKLAND, CALIF.
Pacific Graphite Co Inc.

PHILADELPHIA, PEN
Pennsylvania Foundr Sup. & Sand Co

PITTSBURGH, PENN
S. Obermayer Co.

ST. LOUIS, MO.
M. A. Bell Co.
M. W. Warren Co Co.

TORONTO, CAN.
Canadian Foundry Sup. & Equip., Lt

(*Concluded from page* 120)

ing; cleaning; inspection; electrical equipment; mechanical equipment; purchasing; chemical laboratory, and time standards.

This continuity of interest and cooperation on the part of industry is one of the most significant aspects of the program, in view of the fact that one of the reasons the foundry school was dormant for 18 years was because industry did not properly support the school system's efforts in foundry training. Muskegon foundrymen are determined that this shall not occur again.

The manner in which a typical student at the school comes in contact with foundry subjects is as follows. In his seventh, eighth and ninth grades the student takes eight units of exploratory work in various shop practices, including foundry. These units vary in length according to the subject. Foundry training in this unit is very elementary and more or less of a laboratory type of experimental work to acquaint the student with the basic principles of casting. It is conducted in a separate classroom from the foundry school section.

Student Decides on Course

By the time the student has reached the tenth grade he can begin to consider the trade he likes best based on his previous courses relating to the various shop practices. In the tenth grade the boy takes two semesters of related courses, called an industrial cycle, which includes training in mechanical drawing, pattern-making, foundry, and machining and finishing. Foundry training is limited to one hour a day and consists of study of the basic fundamentals of foundry work preparatory to the student's entering the actual foundry course in the eleventh grade, if he chooses. Should he enter the foundry practice class in the eleventh grade, he takes one-half hour per day instruction in all the foundry operations, as well as thorough training in laboratory technique.

His thorough preparation at this level will aid him in the twelfth grade where he may take another advanced course of three hours each day in foundry practice. The student's understanding of the basic physics and chemistry involved in his job is expected to make him a much better foundry employee than the average apprentice who, for example, may learn a molding operation without any basic understanding of the reasons for ramming the sand to a certain hardness. It is also regarded important that every boy should receive training in academic subjects designed to make him a better informed and better balanced citizen of his community than would be possible through training in his trade alone.

In addition to formal class training, use is expected to be made of motion pictures and plant visitations. Also, the chapter advisory committee hopes to arrange for speakers to address the class on various subjects of foundry practice in more specific detail than will be covered in class lectures.

Among the special features of the foundry course will be a special motion-time analysis which will permit the student to compare his efforts with industrial standards for various operations. It is planned to make this an integral part of the training program as soon as the boys are familiar with their tools and equipment, in order that they may understand the value of motion economy through doing the job the right way.

Emphasis also will be placed on evaluation of the various costs that go into the production of castings. Still in the planning stages, it is proposed to determine a typical cost setup covering direct labor, departmental overheads, fixed costs and other charges, and of course the final selling price. The boys will be trained to consider all the variables in arriving at their estimates of the various costs. The school foundry will be considered for class work as an actual manufacturing foundry with a fixed capitalization comparable to an industrial enterprise. Each boy will then attempt to produce the unit involved in his class operation within the framework of the cost estimate so that he can meet a fixed selling price and make a profit for his fictitious company.

This plan, it is hoped, will demonstrate the many manufacturing costs —besides those of labor and raw materials consumed—which must be accounted for within the selling price of a product. It will be shown how tools, equipment, selling costs and other overhead factors must be paid for out of the selling price with a margin left for profit and reinvestment reserves if the "company" is to continue to operate and if the student is to have job security or a business of his own in the future.

Course Is Comprehensive

A comprehensive course has been prepared covering the various subjects which will be studied by the foundry students. General titles of the topics to be treated in detail include the following:

Introduction, which includes such items as safety and good shop keeping, general description of the history and importance of cast metals, types of products and duties of different members of the foundry personnel; foundry terminology; foundry tools and equipment; foundry flasks and rigging; patterns; foundry sands; sand handling and processing; sand testing; fundamental principles of molding; sequential steps in molding course; machine and bench molding; melting equipment; cupola theory and operation; electric furnace theory and operation; refractories and fluxes; nonferrous furnace operation; metal handling; coremaking; casting cleaning; casting inspection; elements of metallurgy. It is recommended that students taking the foundry course elect chemistry and physics as related courses.

Aluminum Alloy Specifications

A new compilation of important aluminum industry specifications has been published by Federated Metals Division, American Smelting & Refining Co. which supersedes the 1944 publication of the same title.

The 24-page book entitled, "Aluminum Alloys, U.S. Standard Specifications," includes the latest Federal, Army, Navy, Army-Navy, Air Corps, Ordnance, Society of Automotive Engineers, Aeronautical Material Specifications, and American Society for Testing Materials specifications which pertain to sand castings, permanent mold castings, die castings, ingot and wrought alloys.

Copies of the booklet can be obtained free by addressing Dept. AE of the Federated Metals Div., American Smelting & Refining Co., 120 Broadway, New York 5.

AROUND Detroit

By A. H. ALLEN
Detroit Editor
THE FOUNDRY

Pontiac installs dust collectors and flame suppressors on new cupolas. . . Captive automotive foundries busy but jobbing operations slip. . . Cast scrap market declines sharply

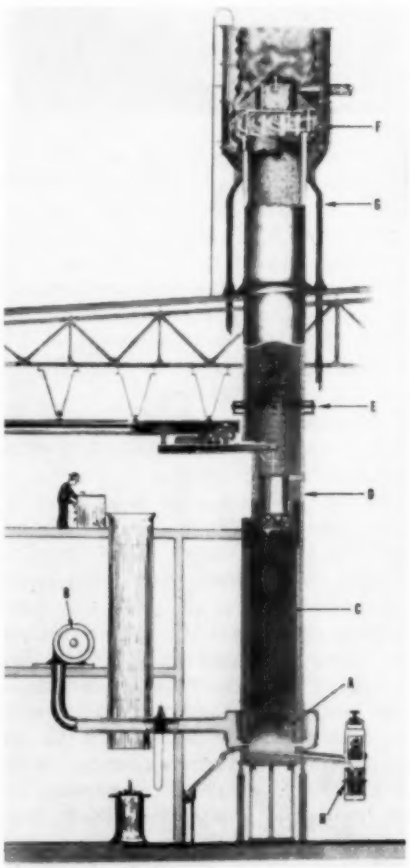
VIGOROUS attack on the problem of cupola dust collection and suppression continues to be pushed by the foundry divisions of General Motors. It will be recalled Buick was one of the first plants to develop equipment for this purpose, fitting its six cupolas with spray-type collectors prior to the war. They are of relatively simple design, with conical caps positioned over the tops of the stacks inside sheet steel housings. Water sprays are diverted downward over these cones, which reverse and slow down the flow of emerging gases while the water sprays entrap solids and carry them by gravity down discharge pipes.

A more complicated, more expensive and probably somewhat more efficient system has been installed on the battery of cupolas at the Pontiac gray iron foundry. Six original cupolas were so equipped, and similar but larger installations have been made on two new melting units. A cross section of a complete stack is shown in the accompanying illustration. Melting zone in the stack is at *A*, with molten iron pouring into transfer ladles on monorails at *H*, and slag tapping out the rear. *B* is of course the blower furnishing air to the stack at 16,000 cfm. Charge of pig iron, steel, cast scrap, coke and limestone is indicated at *C*, fed in through a bottom-drop charging bucket traveling on a monorail at *D*, Note how buckets are raised from ground floor through elevator shaft between the stack and the blower.

At *E* is diagrammatic representation of a water spray unit or flame suppressor which introduces an atomized mixture of water and air into the rising gases as they swirl upward to the suppressor at *F*. Here a combination of cyclone-type blower unit, conical cap and water sprays further wets down particles of ash and fine coke and washes them down into discharge pipes at *G*. These pipes convey the sludge to a settling basin outside the plant, from which solids are removed by conveyor to a high collection bin. Trucks back under this bin to receive the collected solids and carry them away to a dump.

The large cylindrical section atop the cupola stack serves to slow down velocity of the rising gases and to give a better whirling action so that the maximum removal of solid particles can be achieved. Estimates vary as to thoroughness of the dust removal. Manufacturer of the equipment figures about 90 per cent, although some of the GM foundry engineers raise this to 95 per cent. The difficulty of course is in measuring the solid content of what few light-colored fumes do drift out the tops of the collectors.

An important element in the setup is the flame suppressor at *E*. This comprises a windbox with suitable spray nozzles which introduce a highly atomized high-pressure air-water mixture, serving to reduce gas temperatures by about 600 degrees and to consume any unburned and noxious gases. Maker of the equipment refers to it as a stack gas oxidizer. Engineers at the Pontiac foundry are enthusiastic over the dust collection equipment and talk in glowing terms of appreciable increases in production capacity resulting from the installation.



Cross section of 98-inch foundry cupola and accessory equipment, showing arrangement of flame suppressor and dust collector

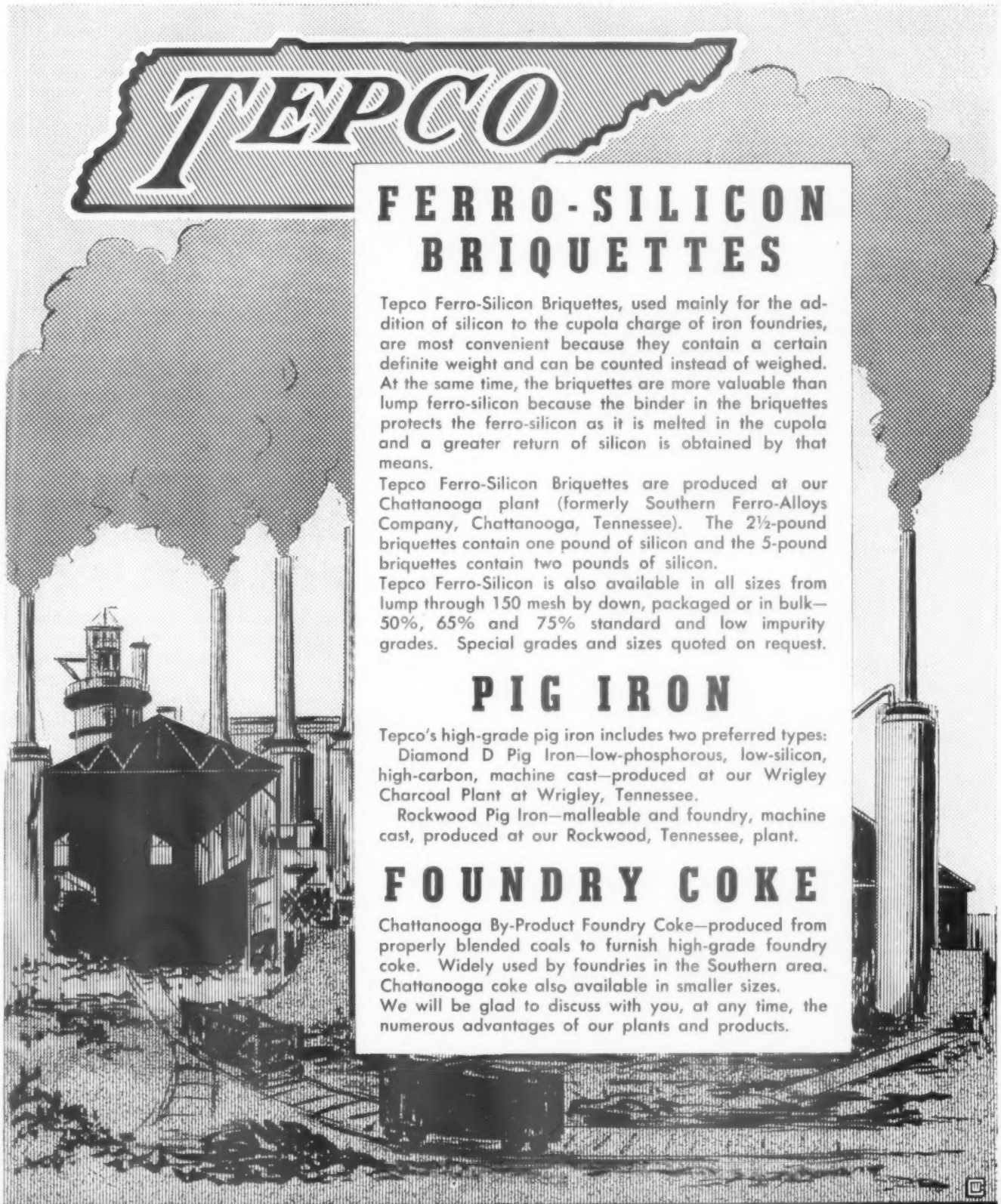
Many attempts have been made over the years to improve the thermal efficiency of the foundry cupola. Such things as hot blast, dry blast, water cooling, introduction of oxygen, waste heat recovery and the like are aimed in this direction. While many of the changes have brought improved operations, whether or not they justify the expense must be determined by analysis of all costs involved. The suggestion has been made that it might be worthwhile to study pressurized melting in the cupola, doubtless in recognition of the economies which blast furnace operators have effected with pressure blowing of these units. Again it probably comes back to a matter of cost. The cupola would have to be redesigned to permit the use of stack pressure; in other words, it would have to be built more like a blast furnace, and whether the resulting economies would prove out in terms of cost of the installation is the kernel of the question.

There is little argument, however, with the contention that the foundry cupola today offers opportunities for improvement, and the automotive industry, with its eyes increasingly focused on better methods and lower costs, can be expected to turn eagerly to new ideas in the iron melting process.

* * *

WHILE business sentiment continues to be more pessimistic than actual business itself, most jobbing foundries hold to a low operating level, in contrast to the larger captive automotive foundries which are driving hard to keep up with ambitious production schedules. Market for cast iron scrap has tumbled precipitately, and tonnages are reported going begging at any price. Prin-

(*Concluded on page* 127)



FERRO-SILICON BRIQUETTES

Tepco Ferro-Silicon Briquettes, used mainly for the addition of silicon to the cupola charge of iron foundries, are most convenient because they contain a certain definite weight and can be counted instead of weighed. At the same time, the briquettes are more valuable than lump ferro-silicon because the binder in the briquettes protects the ferro-silicon as it is melted in the cupola and a greater return of silicon is obtained by that means.

Tepco Ferro-Silicon Briquettes are produced at our Chattanooga plant (formerly Southern Ferro-Alloys Company, Chattanooga, Tennessee). The 2½-pound briquettes contain one pound of silicon and the 5-pound briquettes contain two pounds of silicon.

Tepco Ferro-Silicon is also available in all sizes from lump through 150 mesh by down, packaged or in bulk—50%, 65% and 75% standard and low impurity grades. Special grades and sizes quoted on request.

PIG IRON

Tepco's high-grade pig iron includes two preferred types:

Diamond D Pig Iron—low-phosphorous, low-silicon, high-carbon, machine cast—produced at our Wrigley Charcoal Plant at Wrigley, Tennessee.

Rockwood Pig Iron—malleable and foundry, machine cast, produced at our Rockwood, Tennessee, plant.

FOUNDRY COKE

Chattanooga By-Product Foundry Coke—produced from properly blended coals to furnish high-grade foundry coke. Widely used by foundries in the Southern area. Chattanooga coke also available in smaller sizes.

We will be glad to discuss with you, at any time, the numerous advantages of our plants and products.

TENNESSEE PRODUCTS & CHEMICAL CORPORATION

GENERAL OFFICES: NASHVILLE, TENNESSEE

PLANTS AT CHATTANOOGA, ROCKWOOD AND WRIGLEY, TENN.

Represented by

MILLER & CO., Chicago, St. Louis, Cincinnati; S. H. BELL CO., Pittsburgh; T. H. BENNERS & CO., Birmingham

SOLID Castings!

Famous Cornell Flux Improves Cupola Operation, too!
It keeps cupolas cleaner and by forming a glazed or vitrified surface over and above the melting zone it prolongs life of brick and prevents "arching over" to a great extent. Drops are cleaner. Maintenance time and cost is surprisingly little.

Write for Bulletin 46-B

The CLEVELAND FLUX Company

1026-1036 MAIN AVENUE, N.W., CLEVELAND 13, OHIO

Manufacturers of Iron, Semi-Steel, Malleable, Brass, Bronze, Aluminum and Ladle Fluxes—Since 1918

Stronger, denser grained castings, great reduction of hard spots, hollow centers, chilled sides, and easier machining—that's what you gain by cleansing your molten iron with—

Famous CORNELL CUPOLA FLUX

It makes metal hotter and freer flowing and there is a very *noticeable reduction of sulphur.*
The best evidence of its value to the industry is our list of leading foundries who have used it regularly for years.

FAMOUS CORNELL CUPOLA FLUX IN SCORED BRICK FORM, makes cleansing of metal a faster, easier, more accurate and low cost operation. No digging out of container. No weighing. No measuring. No waste.

SIMPLE TO USE. You toss Famous Cornell Flux into cupola with each ton charge of iron, or break off one to three briquettes (quarter sections) for smaller charges. Being in solid (not powder) form, this flux does not blow out with the blast but stays in melting zone until entirely consumed, insuring full efficiency.

• **MALLEABLE FOUNDRIES,** with cupola operation, are showing a rapid trend towards the use of Famous Cornell Cupola Flux. Reports of greatly improved casting production come from every direction. Furthermore, there is a considerable reduction in cupola maintenance labor and cost. The life of cupola lining, whether brick or stone, is greatly prolonged.

FAMOUS CORNELL FLUXES
Trade Mark Registered

Write for Bulletins ➡

Famous CORNELL ALUMINUM FLUX

Produces clean, tough castings. No spongy or porous spots even when more scrap is used. Thinner yet stronger sections are poured. Castings take a higher polish. NO FUMES! Exclusive formula prevents obnoxious gases. Metal does not cling to dross.

Famous CORNELL BRASS FLUX

Makes metal pure and clean, even when dirtiest brass turnings or sweepings are used. Produces castings which withstand high pressure tests and take a beautiful finish. Saves considerable tin and other expensive metals. Crucible and furnace linings are preserved.

Famous CORNELL LADLE FLUX

Place a few ounces in bottom of ladle, then tap cupola. Metal is thoroughly cleansed, foreign impurities are easily skimmed off. Ladles are kept clean, there is less patching and increased ladle life. Metal temperatures are retained during transfer to molds.

(*Concluded from page* 124)

cipal reason, other than slower operations among most smaller melters, is the ridiculously high price the material had climbed to in relation to current quotations of foundry pig iron. As long as pig iron was in short supply, the scramble for scrap would be bound to push the price to the $65 or $70 per ton level; now that pig iron is easier, scrap has receded and should wind up at a price near that of pig iron.

Seasonal influences are seen as an important factor explaining the slowness in many lines of goods. The stove industry, for example, has experienced sharp cutbacks, which have hit some sections of the foundry trade adversely. There is hope, however, that spring months may reawaken buying in this field. Even sales of new cars have slowed to a considerable degree, but that has always been a normal development in January and February and gives manufacturers an opportunity to build up dealer stocks. Since the war, dealer stocks of new cars have been virtually nil and by spring they should be back up to what has been considered normal in a competitive market.

Forecast Greater Production

Little pessimism is heard in the ranks of automotive officialdom. C. E. Wilson, president of General Motors, has forecast a 6,000,000-car year for 1949, against 5,500,000 last year. Packard is looking to a 30 per cent boost in its production this year. And so on down the line. New Chrysler division models have now swung into fairly good production after a slow period last month when changeovers were being effected. Public reaction to them is awaited eagerly, for they have been designed and styled with comfort and convenience the top considerations, somewhat contrary to the trend of svelte streamlining.

Expenditure of $90 million was made in restyling Chrysler, De Soto, Dodge and Plymouth passenger cars and in refitting plants for their manufacture. No important changes have been made in engines, except for a slight increase in compression ratios. Much interest centers in a new roadster model to be featured by Dodge, the first of this type to be offered by the automotive industry in 20 years or more. As of this writing, price has not been announced although reports are current it will be around $1300. It is of the conventional roadster design, with manually-operated fabric top and transparent plastic windows which can be inserted in door sockets. Upholstery is imitation leather, and decorative trim practically identical with closed body types.

Both Plymouth and Dodge are offering two wheelbases on their 1949 lines, suggesting Chrysler Corp. may be keeping a weather eye on the market to be ready with attractively priced jobs to compete with Ford and Chevrolet, should buyers begin to show more definite resistance to prices.

Gray Iron Foundry Statistics

Gray Iron Founders' Society is launching an industry-wide monthly statistical service and has invited the 2500 units in the industry to participate. Machinery has been set up to obtain monthly figures on production, number of production employees, total payrolls, number of hours worked, maximum commercial demand and lost-time injuries. E. L. Roth, president of Motor Castings Corp., West Allis, Wis., is chairman of the society's statistical committee.

Magnesium Meeting

Annual spring meeting and product exhibit of the Magnesium Association will be held at the Edgewater Beach Hotel, Chicago, Apr. 19-20. Eight technical sessions, covering various phases of the magnesium industry, are scheduled and will include presentation of papers by well known metallurgical engineers.

Bardes Foundry Inc., 2619 Colerain Ave., Cincinnati, recently has been organized with Oliver L. Bardes as president. The organization will be operated separately from the Bardes Forge & Foundry Co., of the same address.

Meeting Calendar

Feb. 28-Mar. 4—American Society for Testing Materials, committee week, Edgewater Beach Hotel, Chicago

Mar. 4—Malleable Founder's Society, eastern sectional meeting, New York

Mar. 11-12 — Ohio Regional Conference, sponsored by Ohio AFS Chapters, Ohio State University, Columbus, O.

Mar. 14-17 — Chicago Technical Societies Council, conference and production show, Hotel Stevens, Chicago

Mar. 25 — Malleable Founders' Society, western sectional meeting, Palmer House, Chicago

Apr. 11-15—American Society for Metals, sixth Western Metal Congress and Exposition, Shrine Auditorium, Los Angeles

Apr. 14—National Castings Council, annual meeting, Hotel Cleveland, Cleveland

Apr. 14-15—Magnesium Association, annual meeting, Edgewater Beach Hotel, Chicago

Apr. 18-20—American Institute of Mining and Metallurgical Engineers, National Open Hearth Steel Committee annual meeting, Palmer House, Chicago

Apr. 18-20—Midwest Power Conference, Sherman Hotel, Chicago

Apr. 19-20—Magnesium Association, annual meeting, Edgewater Beach Hotel, Chicago

Apr. 22 — Malleable Founders' Society, western sectional meeting, Palmer House, Chicago.

May 1—Non-Ferrous Founders' Society, directors' meeting, St. Louis

May 2-5—American Foundrymen's Society, annual convention, St. Louis

May 12-13—Instrument Society of America, annual spring meeting, Royal York Hotel, Toronto

May 16-18—Industrial Manufacturers Association, annual meeting, the Cavalier, Virginia Beach, Va.

May 20—Malleable Founders' Society, eastern sectional meeting, New York

May 27—Malleable Founders' Society, western sectional meeting, Palmer House, Chicago

June 9-10 — Steel Founders' Society of America, industrial relations meeting, Drake Hotel, Chicago

June 16-17—Malleable Founders' Society, annual meeting, Homestead Hotel, Hot Springs, Va.

June 27-28—American Foundrymen's Society, chapter chairmen's conference, Chicago

June 27-July 1—American Society for Testing Materials, annual meeting, Chalfonte-Haddon Hall, Atlantic City, N. J.

July 28-29—American Foundrymen's Society, annual directors meeting, Chicago

Oct. 10-14—American Society for Testing Materials, Pacific Coast meeting, Fairmont Hotel, San Francisco

Oct. 13-14 — Steel Founders' Society of America, fall meeting, Ambassador Hotel, Los Angeles

Oct. 13-15—Foundry Equipment Manufacturers Association, annual meeting, Greenbrier Hotel, White Sulphur Springs, W. Va.

Oct. 17-21—American Society for Metals, metal congress and exposition, Public Auditorium, Cleveland

Oct. 27-28—Gray Iron Founders' Society, annual meeting, Edgewater Beach Hotel, Chicago

Nov. 3-5—Meehanite Metal Institute, annual meeting, Hotel Carter, Cleveland

Nov. 15-16—Regional Foundry Conference sponsored by the Michigan AFS chapters, Michigan State College, East Lansing, Mich. (Tentative)

Nov. 15-17 — National Foundry Association, annual meeting, Waldorf-Astoria Hotel, New York

Nov. 25-26—New York Regional Conference, sponsored by New York AFS chapters

1950

(Tentative Schedule)

Feb. 8-9 — Steel Founders' Society of America, annual meeting, Edgewater Beach Hotel, Chicago

May 8-12—American Foundrymen's Society, annual convention and exhibition, Cleveland

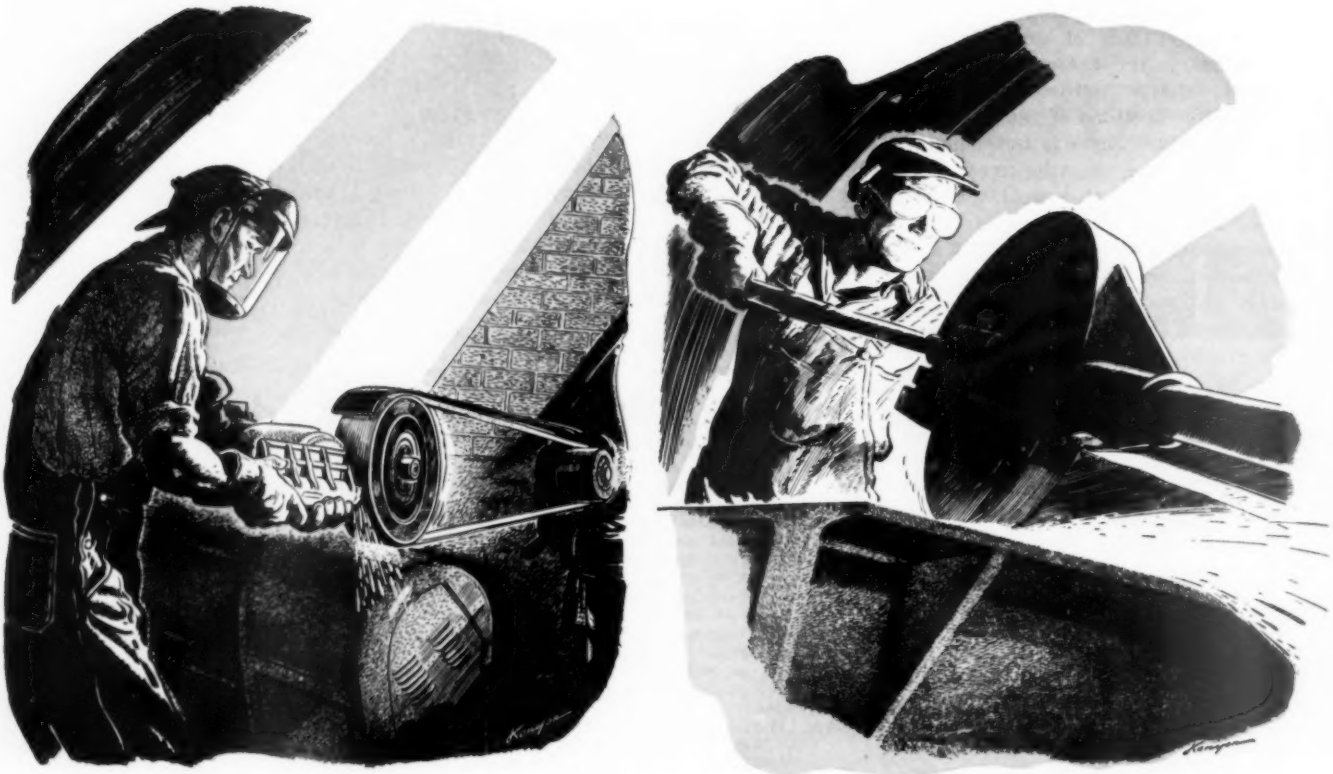
Oct. 12-13—Foundry Equipment Manufacturers' Association, annual meeting, Greenbrier Hotel, White Sulphur Springs, W. Va.

Oct. 19-20—Gray Iron Founders' Society, annual meeting, Netherland Plaza Hotel, Cincinnati

Nov. 8-10—National Foundry Association, annual meeting, Edgewater Beach Hotel, Chicago

A note on Abrasives

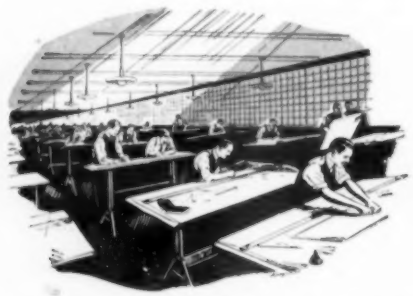
Better utilization is leading to higher productivity...lower cost



New developments in abrasive uses are being introduced continually. They are offering new production efficiencies and often provide the solution to difficult and complicated problems.

The degree to which these benefits and improvements are realized depends upon obtaining the full value offered by these products. It means utilizing them to best advantage. The best product available will not deliver top performance under unsuitable conditions. A slight change in grit or splice—or in grade, shape, or speed can often reduce a cost or improve a finish. That is why it is so important to "fit" the abrasive products you use to the job. In the experience of many abrasive users, it is a time and money-saving must.

If you would like to know whether you can use a better abrasive product or get more production or economy from the abrasive tools you are now using, it's a simple matter to call in CARBORUNDUM. We invite you to get acquainted with our service where similar problems are being worked out every day. Abrasive engineering, technical cooperative assistance, and the vast facilities and experience of the leading name in abrasives are always ready to serve you. The Carborundum Company, Niagara Falls, N. Y.



The only complete line of Abrasive Tools is

CARBORUNDUM

TRADE MARK

"Carborundum" and "Aloxite" are registered trademarks which indicate manufacture by The Carborundum Company

Engineering News
ON ABRASIVE PRODUCTS

Greater Efficiency from New Coated Abrasives

A much higher degree of efficiency is being realized in dry grinding operations on metals. It is credited to the development of a new Resin Industrial Cloth specially designed for use on backstand idlers. This product is particularly effective on operations involving heavy stock removal, sharp contours, high belt speeds, heat sensitive metals, excessive frictional heat, humidity and other complications.

Strength, heat-resistance and backing characteristics provide longer productive life where severe strains are imposed. A remarkable freedom from gumming and loading, together with resistance to grain shedding, produce fine finishes, results in infrequent belt changes. This means stepped up production . . . longer runs.

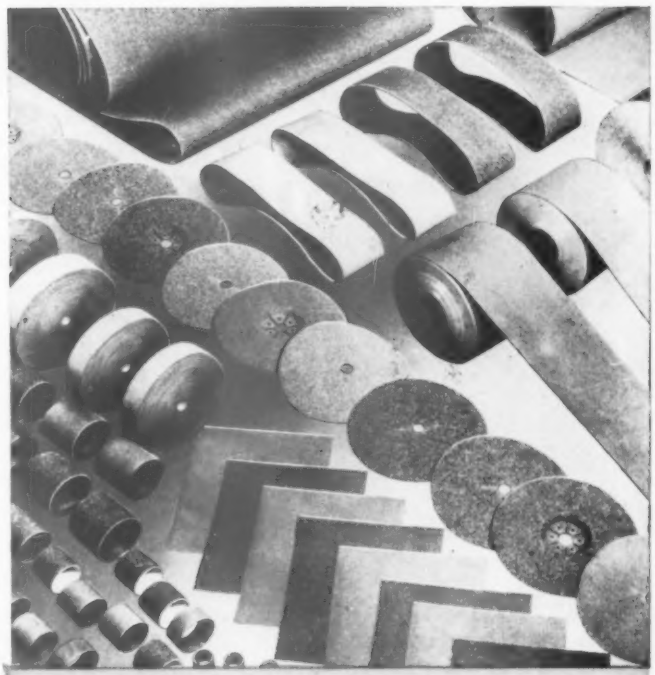
To attain the greatest productivity at low cost from Resin Industrial Cloth, attention must be closely centered on its correct selection and utilization. Our field men are fully informed and experienced. It is only logical to ask their advice on your particular application. They will be glad to cooperate.

New Development in High Speed Snagging Wheels

B-5 and B-7N are a recent development in ALOXITE aluminum oxide resinoid bond wheels that represent a major advance in high speed snagging. Actual operating experience in foundry, mill, forge and welding shop operations confirms a long list of advantages. A cutting rate as high as 9500 surface feet per minute is maintained continuously throughout the extended life of these wheels; primarily because the tendency to load is much less than with previous wheels of this type. A maximum degree of safety is provided the operator under severe conditions. Speed tests to destruction reveal a much higher mechanical strength while field tests show greatly improved resistance to heat and mechanical shock.

On the less severe applications, the relatively softer bond B-5 provides faster cutting and delivers greater efficiency. The tougher B-7N is more efficient on severe operations and lasts longer As further proof that this strength and toughness do not detract from grinding efficiency, more than a few operating reports show savings up to 50% realized where correct selection and application has been made. The experience and knowledge that fostered the development of these wheels is available, through our men in the field, in selecting the correct grit and grade to produce such results.

For prompt attention to abrasive problems, call your nearest branch office of The Carborundum Company.



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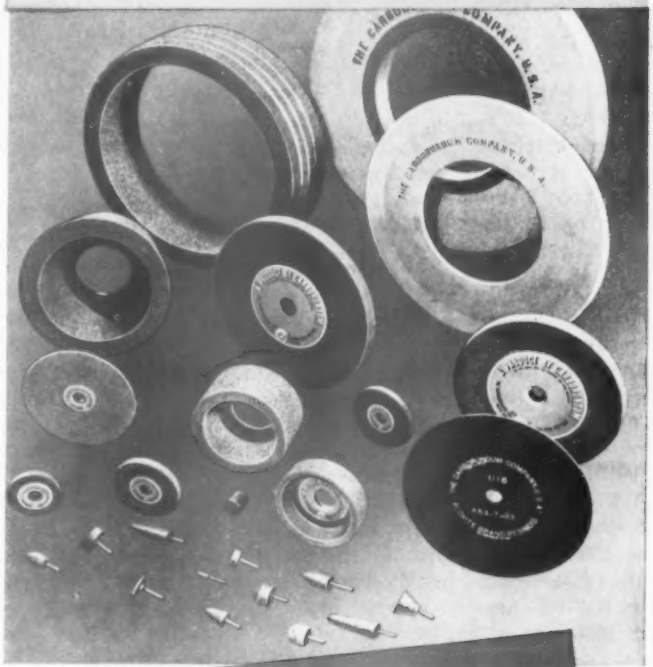


FOR EVERY ABRASIVE APPLICATION
. . . CALL IN
CARBORUNDUM
TRADE MARK

FOUNDRY Developments

By EDWIN BREMER

BELIEVED to be the smallest cupola in operation that really melts iron under controlled conditions, is one designed and constructed by Dr. Fred C. Barbour and W. M. Spradlin, McWane Cast Iron Pipe Co., Birmingham, Ala. Diameter inside the lining is 3 in. and the height 18 in. Charges are made up of ½-lb iron, 1 oz coke, and ¼-oz limestone. Design of cupola is similar to that of the regulation size with windbox from which six tuyeres enter. Wind is supplied from a compressed air line. Melting rate is approximately 0.03-ton per hr or 60 lb, which is about 9.9 lb per sq in. of cross-sectional area per hr. Operation is by intermittent tapping with about 2 lb iron per tap. Slag is drawn off through a slag hole at the back.

• • •

REVISION of the Simplified Practice Recommendation for Metal-Cutting Band Saws (Hard Edge, Flexible Back) has been approved for promulgation, according to the Commodity Standards Division, National Bureau of Standards, Washington 25. Bearing the serial number R214-48, the recommendation contains a simplified list of stock types and sizes of hard-edge, flexible-back saws. Width thickness and number of teeth per inch are listed for two types of saws; regular and skip-tooth. It also includes size tolerances as well as general provisions covering type of tooth set, shape of teeth, width of set, and hardness.

• • •

ACCORDING to Dr. E. C. Bain, Carnegie-Illinois Steel Corp., Pittsburgh, in a recent address presented at the 75th anniversary of the opening of Ohio State University, the objectives of industrial research for a large enterprise include: 1—To improve products and develop new ones for old and new markets. 2—To improve processes and equipment in respect to cost, safety and comfort of operators, hygiene and work environment. 3—To select and adapt raw materials for conservation, and to off-set depletion and deterioration of raw material supply. 4—To assist in instrumentation, standardization and quality control. 5—To aid customers in best utilizing the product. 6—To provide training in technological matters. While Dr. Bain indicates that the objectives are for a large enterprise, it appears to us that they apply just as well to small ones.

• • •

DIFFERENTIAL manometer which will detect pressure differences as small as one millionth of an atmosphere over a range of total pressure from 1 mm of mercury to 1 atmosphere has been developed by Harry Matheson and Murray Eden of the National Bureau of Standards, Washington 25. Operating on the principle of the aneroid barometer, the instrument can be used to compare pressures of gases, organic vapors and noncorrosive liquids. It is portable and need not be leveled before operation. The manometer developed at the bureau measures a pressure difference as a change in the separation of a pair of nesting diaphragms indicated by an unbonded wire resistance displacement gage. The two diaphragms are soldered together at their edges to form a very thin capsule into which is admitted one of the vapors whose pressure is to be compared. The other vapor surrounds the capsule externally.

• • •

GALLIUM, a rare, silvery-white metal of unique properties, now is being produced and sold by Aluminum Co. of America. Metal is liquid at 86°F but will not boil until heated to around 3700°F. Its density (5.9) is about that of aluminum, but only half that of metallic mercury, which is liquid at room temperature. Gallium shows a strong tendency to undercool, and the liquid metal may be held for some time at temperatures almost as low as the freezing point of water without solidification taking place. Like water, but unlike most elements, the density of gallium is greater as a liquid than as a solid; gallium actually expands on solidifying. Gallium wets glass and porcelain, and when heated as high as 1000°F a globule of the metal will remain bright and shiny due to a protective natural oxide film which forms on the surface.

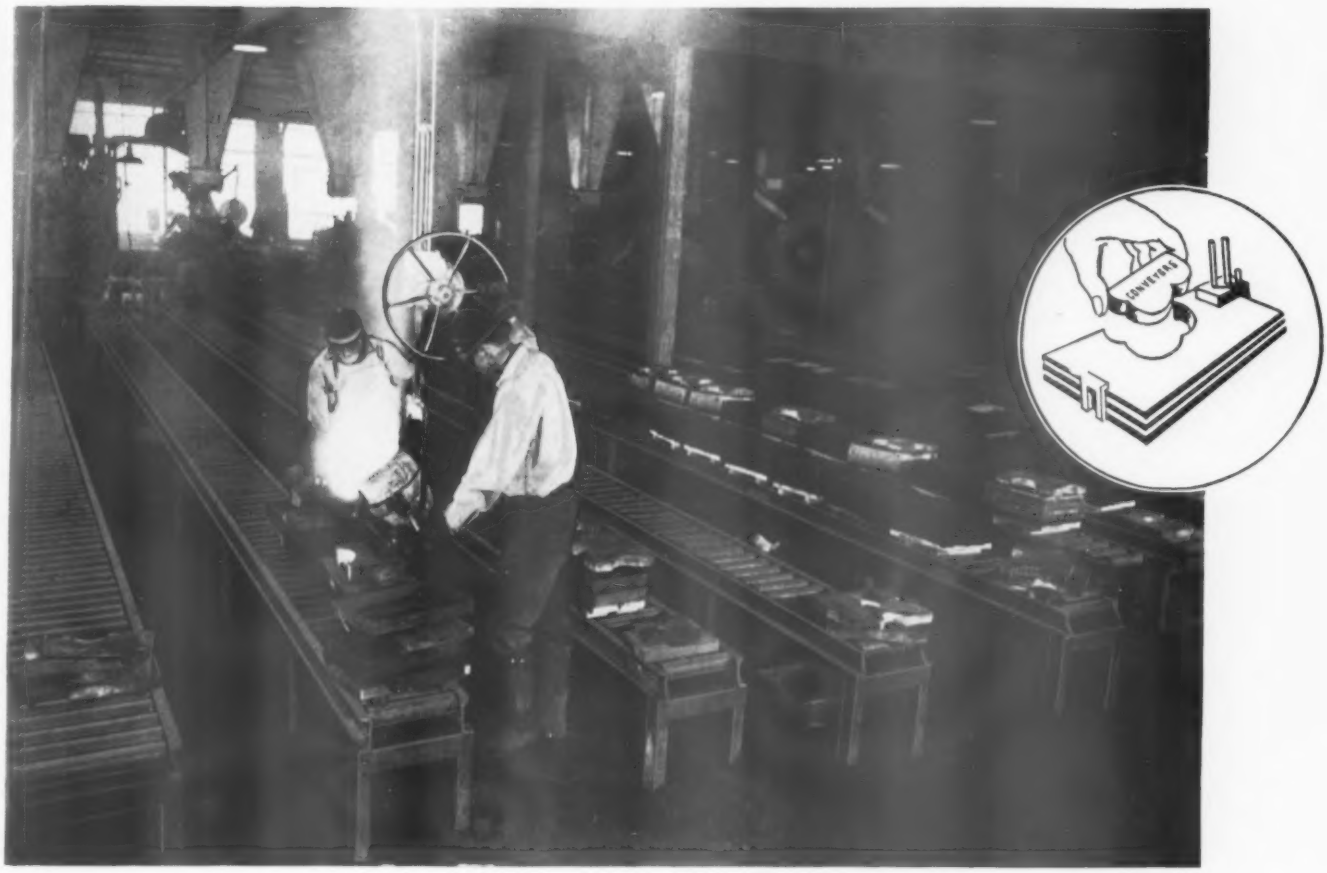
• • •

RADIOACTIVITY is being used to trace the movement of atoms in metals in General Electric Research Laboratory, Schenectady, N. Y. In an experiment just completed it was found that the silver atoms within a block of silver may move between grains as fast as 0.10-in. per week at 500°C (932°F). However, atoms passing through rather than around the grains take about 10,000 years to move an inch, according to the scientists. Experiment was performed with a radioactive isotope of silver called silver-110 which was electroplated on the surface of an ordinary silver block. After several hours at 500°C, the specimen was cooled and layers the thickness of tissue paper were shaved from the block. Each layer was checked for radioactivity with a Geiger counter to determine how far into the block the tagged atoms had gone.

• • •

SPIRAL contractometer, a new direct-heading instrument developed by Abner Brenner and Seymour Senderoff of the National Bureau of Standards, offers a convenient and accurate method for measuring stress in elec-electrodeposits. Compression or tension in a specimen coating deposited on a standard helix is immediately read from a dial as the helix changes curvature in response to forces acting within the plated layer. The device is rugged and self-contained, requires no auxiliary apparatus, and is well adapted to both industrial process control and laboratory research. Essentially the new instrument consists of a flat metal strip wound as a helix and mechanically connected to the pointer of a dial on which the rotation of the free end of the spiral with respect to the fixed end is indicated.

Conveyors are part of the PROCESS



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Through every stage of foundry production, Logan Conveyors release workers from slow, costly hand handling . . . provide a safe, orderly system for each operation. Molds, flasks and castings move on a dependable schedule and the savings in man hours thus effected make conveyors in the foundry an important ***"part of the process."***

We have prepared literature explaining the profitable use of Logan Conveyors in foundry operations . . . request it without obligation.

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INDUSTRY Briefs

DETROIT Gray Iron Foundry Co., Detroit, has acquired the capital stock of Oakland Foundry & Machine Co., Rochester, Mich. E. F. Striker, president and chairman of the board of directors, who organized Oakland Foundry & Machine Co. in 1923, has retired from active business and will make his home in Florida and Detroit. Remaining personnel will remain at the Rochester company.

* * *

War Assets Administration has leased to Western Reserve Steel Corp., Cleveland, two surplus, government-owned facilities at Madison, Ill., operated during the war by General Steel Castings Corp. Facilities have a combined space of 1,400,000 sq ft. Western Reserve Steel Corp. will spend $750,000 for reconditioning of the properties and $5 million for installation of machinery and equipment.

* * *

Westover Engineers, Milwaukee, foundry management consultants, has purchased the Nelson Foundry Co., a nonferrous foundry there. Plant will be used as a laboratory for research work, training of personnel for cost work in the foundry and will be set up as a practical working example to show small foundries how operating costs can be reduced to a minimum.

* * *

Aluminum & Bronze Foundry Inc., South Milwaukee, Wis., recently was formed with capital stock of 250 shares of common at par value of $100, minimum capital to be 4000. Incorporators are E. T. Tal, Charlotte Tal and Erich Luprecht.

* * *

Ryther & Pringle, Carthage, N. Y., has been acquired from Charles I. Ruderman, Gouverneur, N. Y., by C. Walter Clinch, Liverpool, N. Y., and William G. Lewis Jr., Watertown, N. Y. New owners plan to restore the machine shop and foundry and will continue under the same name, engaged in jobbing and manufacture of repair parts for paper mill machinery, and will offer a complete engineering service. Mr. Clinch, who will serve as president, has been engineer, Syracuse Supply Co., Syracuse, N. Y., the last 12 years. Mr. Lewis will continue as foundry superintendent, Carthage Machinery Co., Carthage.

* * *

War Assets Administration has sold to the Sheffield Steel Corp., Kansas City, Mo., a surplus, government-owned blast furnace and by-product coke oven located at Houston, Tex., together with the North and South Basin iron ore beds and beneficiating equipment at Linden and Jacksonville, Tex., for $7,150,000. Properties had been under a three-year lease to Sheffield Steel, which plans to construct two open-hearth furnaces in the immediate vicinity.

* * *

Michigan Oven Co., 4544 Grand River Ave., Detroit 8, has been incorporated to design and fabricate industrial ovens of all types for operating temperatures up to 1100° F. Officers of the company include R. J. Ruff, president; E. C. Herrington, vice president and treasurer; and Paul A. Meyer, secretary, all formerly connected with Young Bros. Co. Sales representatives have been appointed in the principal foundry centers.

* * *

Claud S. Gordon Co., Chicago, has completed construction of its new branch plant at 2035 Hamilton Ave., Cleveland, facilities including a service laboratory and equipment showroom. Cleveland manufacturing operations and local sales office have been transferred to the new plant, which is under direction of E. W. Romig, vice president and general manager.

* * *

Avondale Stove & Foundry Co., Birmingham, manufacturer of stoves and other gray iron products, has been acquired by J. F. Day Sr. and J. F. Day Jr., who operate the J. F. Day Screen & Weatherstrip Co., there. The stove company was sold by the estate of the late John Prowell, for approximately $50,000.

* * *

Foxboro Co., Foxboro, Mass., has begun construction of an addition to its building at 5151 Baum Blvd., Pittsburgh. A. H. Shafer continues as district manager there. A new branch office has been opened at 123 W. College Ave., Appleton, Wis., under management of Milton A. Schreiner; also at 6225 Brookside Ave., Kansas City, Mo., under management of George J. Willier, and at 115 North 19th St., Baton Rouge, La., under management of John B. Deaderick. Eugene F. Machell has been appointed resident engineer in Milwaukee, with headquarters at 209 N. 79th St., and Russell E. Steward, resident engineer in Frankfort, N. Y., serving the Utica, N. Y., area.

* * *

Arwood Precision Casting Corp., Brooklyn, N. Y., manufacturer of precision investment castings, has acquired the precision casting facilities of Precise Castings Corp., division of Cooper Alloy Foundry Co., Hillside, N. J. Acquisition will double the foundry's production capacity for precision casting of steel and will result in a 25 per cent overall increase in total casting potential.

* * *

Black & Decker Mfg. Co., Towson, Md., has announced the opening of a new factory service station at 1094 Gilbert Ave., Cincinnati, under direction of Robert A. Brown, service engineer. The service station in Denver has been moved to a new building recently completed by the company at 1010 Bannock St., and continues under direction of Elmer F. Sitton, service engineer.

* * *

Pacific Foundry Co. Ltd.'s two-story brick building, and Crucible Brass Foundry's two-story wood frame building, were swept by fire Jan. 18, causing damage estimated at more than $100,000. Fire also spread through the adjacent plants of the Mission Foundry & Stove Works and the Bay Engine and Parts Co.

* * *

Combined volume of shipments of ingot brass and bronze, as reported by the Ingot Brass & Bronze Industry, Chicago, was 20,954 tons for December, 21,731 tons for November and 23,862 tons for December, 1947. Total for the year 1948 was 279,500 tons, compared with 263,711 tons for 1947.

* * *

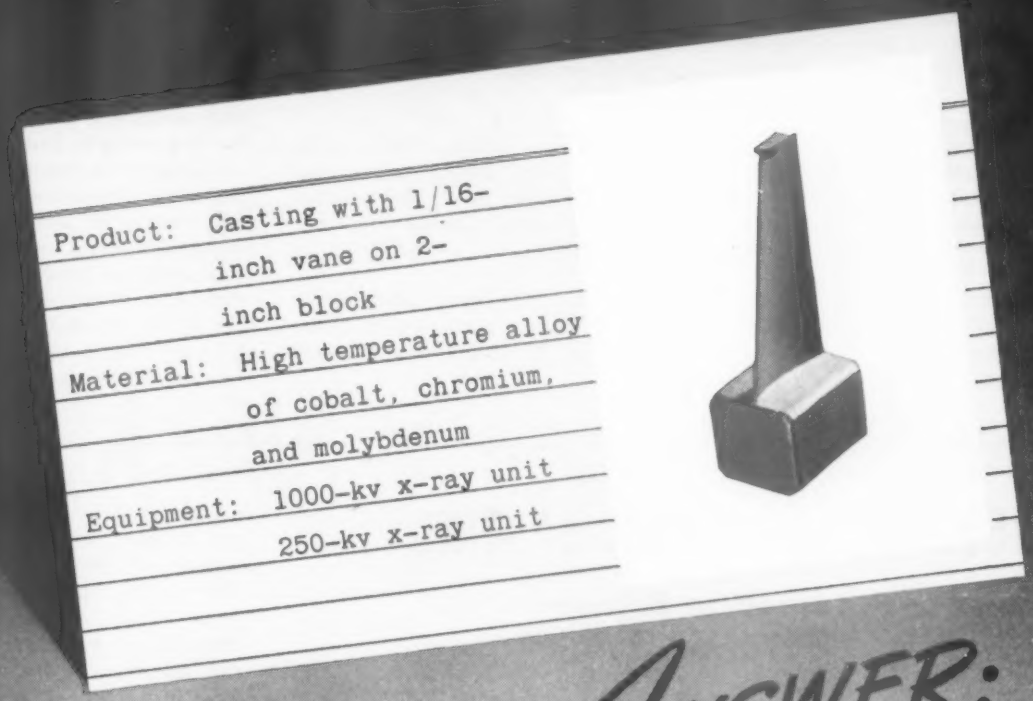
Kilby Mfg. Co., Cleveland, producer of machinery and gray iron castings, has discontinued business. John C. Nierath was president of the 60-year-old company, which at one time was one of the largest manufacturers of sugar machinery in the country.

* * *

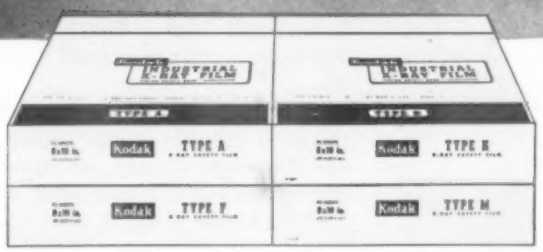
Swartwout Co., Cleveland, has established a company office at 1817 East Allegheny, Philadelphia, to house its power plant control equipment division. R. J. Jones and R. H. Frost have been placed in charge of

(*Concluded on page* 136)

WHAT'S THE RIGHT X-RAY FILM?


Product: Casting with 1/16-inch vane on 2-inch block
Material: High temperature alloy of cobalt, chromium, and molybdenum
Equipment: 1000-kv x-ray unit
250-kv x-ray unit

ANSWER:



A TYPE OF FILM FOR EVERY PROBLEM

To provide the recording medium best suited to any combination of radiographic factors, Kodak produces four types of industrial x-ray film.

Type M provides maximum radiographic sensitivity, high contrast, and exceptional detail under direct exposure or with lead-foil screens. It has extra fine grain and the speed is adequate for examination of light alloys at average kilovoltage and for much million-volt radiography of thin steel and heavy alloys.

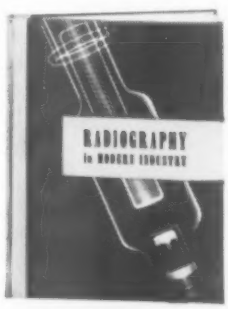
Type A offers high contrast with about three times the speed of Type M, but with slightly more graininess. Used direct or with lead-foil screens for study of light alloys at low voltages, and of heavy steel parts at 1000 kv.

Type F provides the highest available speed and contrast when exposed with calcium tungstate intensifying screens. Has wide latitude with either x-rays or gamma rays, exposed directly or with lead screens.

Type K has medium contrast with high speed. For gamma-ray and x-ray work where highest possible speed is needed at available kilovoltage without use of intensifying screens.

KODAK INDUSTRIAL X-RAY FILM, TYPE M

In examining this casting, the radiographer used Type M Film because it provides maximum radiographic sensitivity. Its speed is adequate so that the million-volt unit got through the two-inch base block with reasonable exposure, while the 250-kv unit proved sufficient for the thin vane. The high contrast and detail-resolving ability of Type M revealed clearly the thread-like cavities present in the casting.



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Radiography

another important function of photography

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(*Concluded from page* 134)

the new office. Sales and service activities of the ventilator and power plant equipment divisions have been separated. William F. Hawk will continue to represent the ventilator division, at 328 Chestnut St., Philadelphia.

* * *

American Brass & Aluminum Foundry, 2400 Santa Fe Ave., Los Angeles, has announced plans to build a unit for collection of zinc oxide fumes. Equipment will cost $9000.

* * *

The three-story brick building in which the Bodine Pattern & Foundry Co., 1601 Cass Ave., St. Louis, has been operating for many years, recently was purchased by Jesse R. Bodine and Lucille M. Bodine.

* * *

Ironton Fire Brick Co., Ironton, O., plans construction of a large new unit to increase production of its refractory products for the foundry industry.

* * *

National-Erie Corp., 1521 Raspberry St., Erie, Pa., recently was damaged by a fire in its No. 1 foundry and core room. Losses were estimated at $50,000.

* * *

Allied Foundry Inc., Shreveport, La., has been incorporated with $100,000 capital, to manufacture metal castings.

Sand School Offered

A sand school comprising three days of instruction on the technique and theory of sand control as it is related to casting quality and quantity is being conducted by the Harry W. Dietert Co., Detroit. Films and slides are used to illustrate new developments in sand testing, and the company's laboratory is available for instruction in actual test work. While the course is designed to cover a planned amount of material, enough flexibility is provided to accommodate individual needs. Reservations are being accepted for the sessions to be held Mar. 7 to 9 and Apr. 4 to 6. No charge is made for the course.

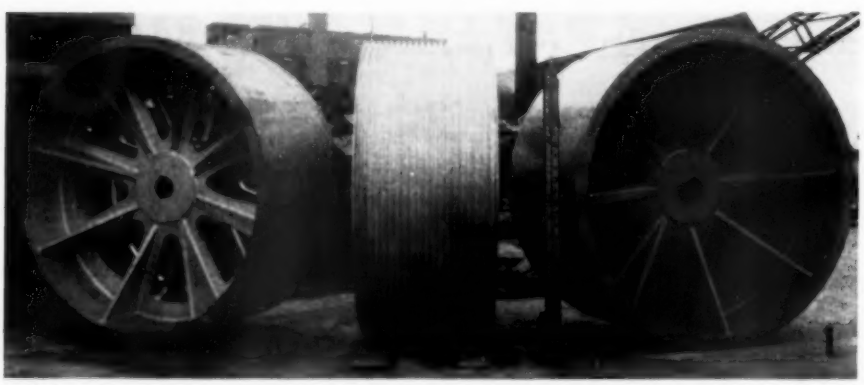
2500-LB ALUMINUM CASTING

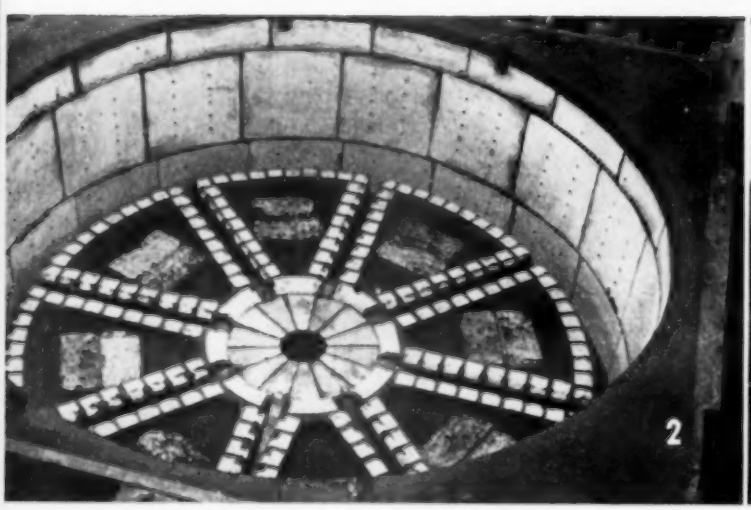
Produced in Britain

WHAT is claimed to be the largest aluminum alloy casting so far produced in Great Britain was a pulley to be used in connection with a drive for oil-field slush pumps. The casting was made at the Western foundries, Southhall, near London, which is the foundry division of the firm of Le Grand Sutliff & Gell Ltd., whose oil-field equipment division was responsible for the design of the part.

The pulleys are of varying sizes as necessitated by ruling conditions on the pumps, and Fig. 1 shows the largest of these pulleys yet made. The casting dimensions are as follows: Rim diameter 73 in., boss diameter 17 in., core diameter 5 in., rim thickness 3 in., length of face 34½ in., depth of boss 17 in., web thickness 1¾ in. The melt was 4000 lb and the casting weighed 3600 lb. Finished machined weight was 2500 lb.

The furnace was built specially for the job, outside of the foundry under the crane gantry extension, and the molten metal transported into the foundry to the molding floor where it was teemed at a temperature of 630° C after degasification and modifying as is usual with aluminum silicon alloy. The number of chills used in the mold may be judged from Fig. 2, showing the open mold. The molding time required was 150 hours. The pattern, turned on a faceplate lathe in the firm's own pattern shop, is shown at the left of Fig. 1. Fig. 3 shows the teeming operation, which took one and a half minutes.





2

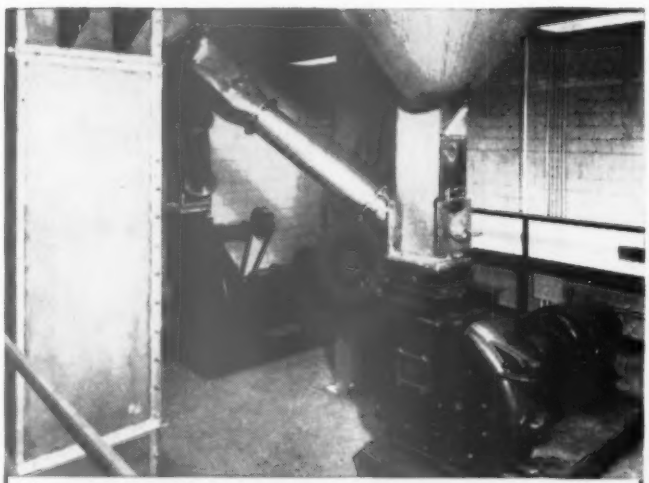
3

Second in a series of Unusual Grinding Wheel Operations

Even ASPIRIN has a headache!

One of the toughest problems of aspirin manufacturers is to produce tablets that will disintegrate and "go to work" quickly. This is partly solved by grinding the dried mixture into the exact consistency before pressing the tablet.

Whatever YOUR grinding problem may be, BAY STATE can solve it . . . fast. Possibly the exact specifications to meet your requirements can be supplied directly from large stocks either in Westboro, branch warehouses, or from our distributors strategically located throughout the United States. *Send us your grinding problems. We can help you.*



Photograph of Aspirin Grinder, Courtesy of The Bayer Company (Sterling Drug Inc., Successor)

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Top Performance Consistently Duplicated

When You Want Both

FLASK SHAKEOUT and

CORE KNOCKOUT

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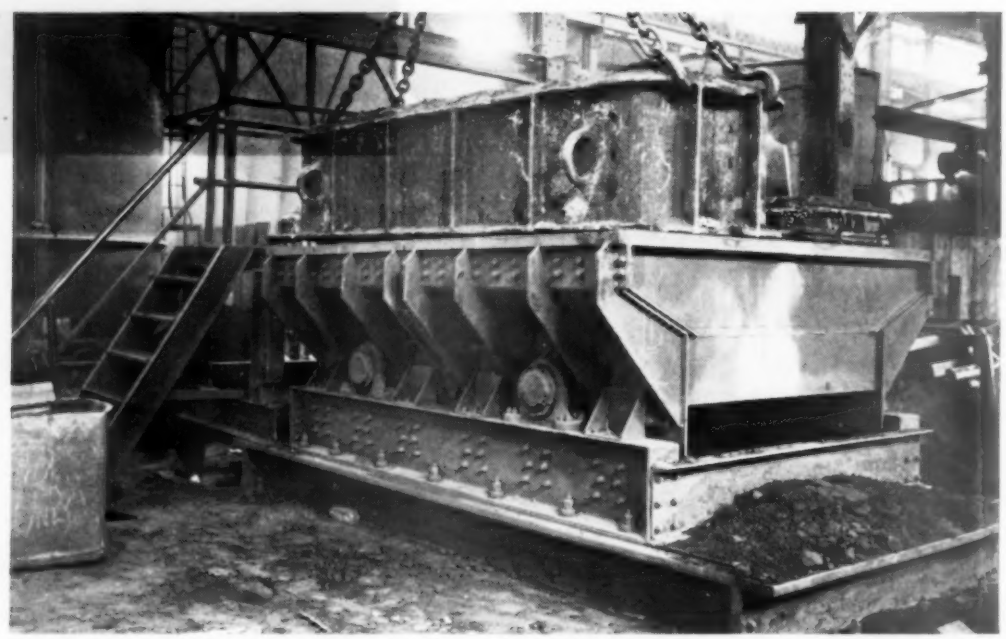
In One Operation

pick SIMPLICITY as 800 foundries have during the past 15 years!



It is nothing new to owners of Simplicity Shakeouts. Whenever they wish to shakeout castings and knockout cores in a single operation they can do it with a Simplicity—and they have been doing it with a Simplicity for the past 15 years! Shown here is a typical Simplicity Shakeout, a Heavy Duty 8 x 10 unit in operation. Our engineers will gladly recommend the proper Simplicity Shakeout for your foundry operations on receipt of your specifications.

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Simplicity

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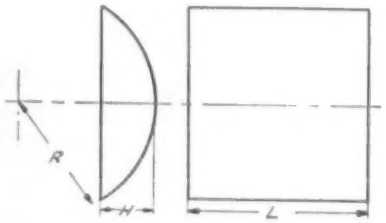
ENGINEERING CO., DURAND, MICHIGAN

FORMULA FOR FINDING THE WEIGHT OF CAST STEEL SEGMENTAL BARS



To find the weight of a cast steel bar whose cross section is a segment of a circle, first divide the height by the radius, and in the table opposite this quotient find K. Then, the weight required is the product of K, the radius squared and the length.

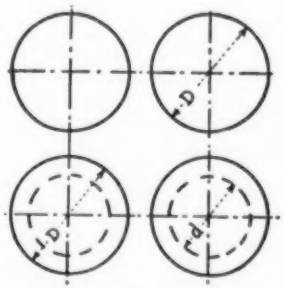
$$W = KR^2L$$

If H is greater than R, find the weight of cylinder of Radius R and subtract weight of part cut away from cylinder.

H/R	K	H/R	K	H/R	K	H/K	R	H/K	R	H/K	R	H/K	R
0.030	0.0028	0.134	0.0257	0.190	0.0430	0.246	0.0628	0.302	0.0845	0.358	0.1081	0.414	0.1331
0.040	0.0043	0.136	0.0263	0.192	0.0436	0.248	0.0635	0.304	0.0854	0.360	0.1089	0.416	0.1341
0.050	0.0060	0.138	0.0268	0.194	0.0443	0.250	0.0642	0.306	0.0862	0.362	0.1098	0.418	0.1350
0.060	0.0078	0.140	0.0274	0.196	0.0449	0.252	0.0650	0.308	0.0870	0.364	0.1107	0.420	0.1359
0.070	0.0098	0.142	0.0280	0.198	0.0457	0.254	0.0657	0.310	0.0878	0.366	0.1116	0.422	0.1368
0.080	0.0120	0.144	0.0286	0.200	0.0463	0.256	0.0665	0.312	0.0886	0.368	0.1124	0.424	0.1377
0.090	0.0143	0.146	0.0292	0.202	0.0470	0.258	0.0672	0.314	0.0894	0.370	0.1133	0.426	0.1387
0.092	0.0148	0.148	0.0298	0.204	0.0477	0.260	0.0680	0.316	0.0903	0.372	0.1142	0.428	0.1396
0.094	0.0152	0.150	0.0304	0.206	0.0484	0.262	0.0688	0.318	0.0911	0.374	0.1151	0.430	0.1405
0.096	0.0157	0.152	0.0310	0.208	0.0491	0.264	0.0695	0.320	0.0919	0.376	0.1159	0.432	0.1415
0.098	0.0161	0.154	0.0316	0.210	0.0498	0.266	0.0703	0.322	0.0928	0.378	0.1168	0.434	0.1424
0.100	0.0166	0.156	0.0322	0.212	0.0505	0.268	0.0711	0.324	0.0936	0.380	0.1177	0.436	0.1433
0.102	0.0171	0.158	0.0328	0.214	0.0512	0.270	0.0719	0.326	0.0944	0.382	0.1186	0.438	0.1443
0.104	0.0176	0.160	0.0334	0.216	0.0519	0.272	0.0726	0.328	0.0953	0.384	0.1195	0.440	0.1452
0.106	0.0182	0.162	0.0340	0.218	0.0526	0.274	0.0734	0.330	0.0961	0.386	0.1204	0.442	0.1462
0.108	0.0187	0.164	0.0346	0.220	0.0533	0.276	0.0742	0.332	0.0969	0.388	0.1213	0.444	0.1471
0.110	0.0192	0.166	0.0353	0.222	0.0540	0.278	0.0750	0.334	0.0978	0.390	0.1222	0.446	0.1480
0.112	0.0197	0.168	0.0359	0.224	0.0547	0.280	0.0757	0.336	0.0987	0.392	0.1231	0.448	0.1489
0.114	0.0202	0.170	0.0365	0.226	0.0554	0.282	0.0765	0.338	0.0995	0.394	0.1240	0.450	0.1499
0.116	0.0208	0.172	0.0371	0.228	0.0562	0.284	0.0773	0.340	0.1003	0.396	0.1249	0.452	0.1509
0.118	0.0213	0.174	0.0378	0.230	0.0569	0.286	0.0781	0.342	0.1012	0.398	0.1258	0.454	0.1518
0.120	0.0218	0.176	0.0384	0.232	0.0576	0.288	0.0789	0.344	0.1020	0.400	0.1267	0.456	0.1528
0.122	0.0224	0.178	0.0391	0.234	0.0583	0.290	0.0797	0.346	0.1029	0.402	0.1276	0.458	0.1537
0.124	0.0229	0.180	0.0397	0.236	0.0591	0.292	0.0805	0.348	0.1038	0.404	0.1286	0.460	0.1547
0.126	0.0235	0.182	0.0401	0.238	0.0598	0.294	0.0813	0.350	0.1046	0.406	0.1295	0.462	0.1556
0.128	0.0240	0.184	0.0410	0.240	0.0605	0.296	0.0821	0.352	0.1055	0.408	0.1304	0.464	0.1566
0.130	0.0246	0.186	0.0417	0.242	0.0613	0.298	0.0829	0.354	0.1063	0.410	0.1313	0.466	0.1575
0.132	0.0251	0.188	0.0423	0.244	0.0620	0.300	0.0837	0.356	0.1072	0.412	0.1322	0.468	0.1585

H/R	K	H/R	K	H/R	K	H/R	K	H/R	K	H/R	K	H/R	K
0.470	0.1595	0.550	0.1990	0.630	0.2403	0.710	0.2831	0.790	0.3269	0.870	0.3716	0.950	0.4167
0.472	0.1604	0.552	0.2000	0.632	0.2414	0.712	0.2842	0.792	0.3280	0.872	0.3727	0.952	0.4179
0.474	0.1614	0.554	0.2010	0.634	0.2424	0.714	0.2852	0.794	0.3291	0.874	0.3739	0.954	0.4190
0.476	0.1623	0.556	0.2020	0.636	0.2435	0.716	0.2863	0.796	0.3303	0.876	0.3750	0.956	0.4201
0.478	0.1633	0.558	0.2031	0.638	0.2445	0.718	0.2874	0.798	0.3314	0.878	0.3761	0.958	0.4212
0.480	0.1643	0.560	0.2041	0.640	0.2456	0.720	0.2885	0.800	0.3325	0.880	0.3772	0.960	0.4224
0.482	0.1652	0.562	0.2051	0.642	0.2467	0.722	0.2896	0.802	0.3336	0.882	0.3784	0.962	0.4235
0.484	0.1662	0.564	0.2061	0.644	0.2477	0.724	0.2907	0.804	0.3347	0.884	0.3795	0.964	0.4246
0.486	0.1672	0.566	0.2072	0.646	0.2488	0.726	0.2918	0.806	0.3358	0.886	0.3806	0.966	0.4258
0.488	0.1682	0.568	0.2082	0.648	0.2498	0.728	0.2928	0.808	0.3369	0.888	0.3817	0.968	0.4269
0.490	0.1691	0.570	0.2092	0.650	0.2509	0.730	0.2939	0.810	0.3380	0.890	0.3829	0.970	0.4280
0.492	0.1701	0.572	0.2102	0.652	0.2520	0.732	0.2950	0.812	0.3392	0.892	0.3840	0.972	0.4292
0.494	0.1711	0.574	0.2112	0.654	0.2530	0.734	0.2961	0.814	0.3403	0.894	0.3851	0.974	0.4303
0.496	0.1721	0.576	0.2123	0.656	0.2541	0.736	0.2972	0.816	0.3414	0.896	0.3862	0.976	0.4314
0.498	0.1730	0.578	0.2133	0.658	0.2551	0.738	0.2983	0.818	0.3425	0.898	0.3874	0.978	0.4326
0.500	0.1740	0.580	0.2143	0.660	0.2562	0.740	0.2994	0.820	0.3436	0.900	0.3885	0.980	0.4337
0.502	0.1750	0.582	0.2154	0.662	0.2573	0.742	0.3005	0.822	0.3447	0.902	0.3896	0.982	0.4348
0.504	0.1760	0.584	0.2164	0.664	0.2583	0.744	0.3016	0.824	0.3459	0.904	0.3907	0.984	0.4359
0.506	0.1770	0.586	0.2174	0.666	0.2594	0.746	0.3027	0.826	0.3470	0.906	0.3919	0.986	0.4371
0.508	0.1780	0.588	0.2185	0.668	0.2605	0.748	0.3038	0.828	0.3481	0.908	0.3930	0.988	0.4382
0.510	0.1789	0.590	0.2195	0.670	0.2615	0.750	0.3049	0.830	0.3492	0.910	0.3940	0.990	0.4393
0.512	0.1799	0.592	0.2205	0.672	0.2626	0.752	0.3060	0.832	0.3503	0.912	0.3953	0.992	0.4405
0.514	0.1809	0.594	0.2216	0.674	0.2636	0.754	0.3071	0.834	0.3514	0.914	0.3964	0.994	0.4419
0.516	0.1819	0.596	0.2226	0.676	0.2647	0.756	0.3082	0.836	0.3526	0.916	0.3975	0.996	0.4427
0.518	0.1829	0.598	0.2236	0.678	0.2658	0.758	0.3093	0.838	0.3537	0.918	0.3986	0.998	0.4439
0.520	0.1839	0.600	0.2247	0.680	0.2669	0.760	0.3104	0.840	0.3548	0.920	0.3998	1.000	0.4450
0.522	0.1849	0.602	0.2257	0.682	0.2680	0.762	0.3115	0.842	0.3559	0.922	0.4009		
0.524	0.1859	0.604	0.2268	0.684	0.2690	0.764	0.3126	0.844	0.3570	0.924	0.4020		
0.526	0.1869	0.606	0.2278	0.686	0.2701	0.766	0.3137	0.846	0.3581	0.926	0.4032		
0.528	0.1879	0.608	0.2288	0.688	0.2712	0.768	0.3148	0.848	0.3593	0.928	0.4043		
0.530	0.1889	0.610	0.2299	0.690	0.2723	0.770	0.3159	0.850	0.3604	0.930	0.4054		
0.532	0.1899	0.612	0.2309	0.692	0.2734	0.772	0.3170	0.852	0.3615	0.932	0.4066		
0.534	0.1909	0.614	0.2319	0.694	0.2744	0.774	0.3181	0.854	0.3626	0.934	0.4077		
0.536	0.1919	0.616	0.2330	0.696	0.2755	0.776	0.3192	0.856	0.3638	0.936	0.4088		
0.538	0.1929	0.618	0.2340	0.698	02766	0.778	0.3203	0.858	0.3649	0.938	0.4099		
0.540	0.1939	0.620	0.2351	0.700	0.2777	0.780	0.3214	0.860	0.3660	0.940	0.4111		
0.542	0.1950	0.622	0.2362	0.702	0.2787	0.782	0.3225	0.862	0.3671	0.942	0.4122		
0.544	0.1960	0.624	0.2372	0.704	0.2798	0.784	0.3236	0.864	0.3682	0.944	0.4133		
0.546	0.1970	0.626	0.2382	0.706	0.2809	0.786	0.3247	0.866	0.3694	0.946	0.4145		
0.548	0.1980	0.628	0.2393	0.708	0.2820	0.788	0.3258	0.868	0.3705	0.948	0.4156		

DATA ON WEIGHTS OF SOLID OR HOLLOW BALLS OR SPHERES



In the accompanying tables are given the weight of balls or spheres in pounds for different diameters D.

To find the weight of a hollow ball, subtract the weight corresponding to the inside diameter d from the weight corresponding to the outside diameter D.

Weight of Ball or Sphere When Cast in

Dia. in in.	Cast iron	Steel	Aluminum	Copper	Zinc	Gun metal	Yellow brass
⅛	.007	.008	.003	.009	.007	.009	.008
¼	.017	.019	.006	.021	.017	.021	.020
⅜	.033	.036	.012	.041	.032	.040	.039
½	.058	.063	.021	.071	.056	.070	.067
⅝	.091	.099	.034	.112	.089	.111	.106
1	.136	.148	.050	.167	.132	.165	.158
1⅛	.194	.212	.072	.238	.189	.235	.226
1¼	.267	.290	.098	.223	.259	.319	.310
1⅜	.354	.385	.131	.435	.345	.429	.413
1½	.460	.500	.170	.564	.446	.556	.535
1⅝	.586	.636	.217	.717	.569	.707	.680
1¾	.732	.795	.271	.896	.721	.884	.851
1⅞	.900	.976	.332	1.10	.873	1.09	1.05
2	1.09	1.19	.404	1.34	1.06	1.32	1.27
2⅛	1.31	1.42	.484	1.60	1.27	1.58	1.52
2¼	1.56	1.69	.575	1.91	1.51	1.88	1.81
2⅜	1.83	1.99	.675	2.24	1.77	2.21	2.12
2½	2.13	2.32	.788	2.60	2.07	2.56	2.48
2⅝	2.47	2.68	.914	3.02	2.40	2.93	2.87
2¾	2.84	3.06	1.05	3.47	2.76	3.42	3.30
2⅞	3.24	3.52	1.20	3.93	3.15	3.92	3.78
3	3.68	4.00	1.36	4.51	3.57	4.45	4.29
3⅛	4.16	4.52	1.54	5.10	4.05	5.03	4.84
3¼	4.68	5.09	1.73	5.73	4.55	5.65	5.44
3⅜	5.25	5.70	1.94	6.19	5.09	6.34	6.10
3½	5.86	6.36	2.17	7.16	5.69	7.06	6.82
3⅝	6.50	7.06	2.40	7.96	6.31	7.85	7.55
3¾	7.20	7.83	2.66	8.84	7.00	8.70	8.37
3⅞	7.95	8.64	2.94	9.74	7.71	9.60	9.24

Weight of Ball or Sphere When Cast in

Dia. in in.	Cast iron	Steel	Aluminum	Copper	Zinc	Gun metal	Yellow brass
4	8.74	9.50	3.23	10.7	8.48	10.6	10.1
4⅛	9.57	10.4	3.54	11.7	9.30	11.6	11.1
4¼	10.5	11.4	3.87	12.8	10.2	12.7	12.1
4⅜	11.4	12.4	4.22	13.9	11.1	13.8	13.3
4½	12.4	13.5	4.60	15.3	12.1	15.1	14.4
4⅝	13.5	14.7	4.99	16.6	13.1	16.4	15.7
4¾	14.6	15.9	5.41	17.9	14.2	17.7	17.0
4⅞	15.8	17.2	5.84	19.4	15.3	19.1	18.3
5	17.1	18.5	6.30	20.9	16.6	20.6	19.8
5⅛	18.4	19.9	6.78	22.5	17.8	22.2	21.3
5¼	19.8	21.5	7.30	24.2	19.2	23.9	22.9
5⅜	21.2	23.0	7.83	25.9	20.6	25.6	24.6
5½	22.8	24.7	8.40	27.9	22.0	27.5	26.4
5⅝	24.3	26.2	9.98	29.8	23.6	29.4	28.2
5¾	26.0	28.2	9.60	31.8	25.2	31.4	30.2
5⅞	27.6	30.0	10.2	33.9	26.8	33.4	32.2
6	29.7	32.0	10.9	36.1	28.6	35.6	34.3
6⅛	31.4	34.1	11.6	38.4	30.5	37.9	36.5
6¼	33.2	36.2	12.3	40.8	32.3	40.2	38.7
6⅜	35.4	38.4	13.1	43.2	34.3	42.6	41.1
6½	37.4	40.7	13.8	45.8	36.4	45.2	43.5
6⅝	39.7	43.1	14.7	48.7	38.6	48.0	46.2
6¾	42.0	45.7	15.5	51.5	40.8	50.8	48.9
6⅞	44.4	48.2	16.4	54.4	43.1	53.6	51.6
7	46.8	50.9	17.3	57.3	45.4	56.5	54.5
7⅛	49.4	53.7	18.3	60.5	48.0	59.6	57.4
7¼	52.0	56.5	19.2	63.7	50.5	62.8	60.5
7⅜	54.8	59.6	20.2	67.1	53.1	66.2	63.8
7½	57.5	62.6	21.3	70.5	56.0	69.5	67.0

Weight of Ball or Sphere When Cast in

Dia. in in.	Cast iron	Steel	Aluminum	Copper	Zinc	Gun metal	Yellow brass
7⅝	60.6	65.8	22.4	74.1	58.8	73.1	70.4
7¾	63.5	69.0	23.4	77.7	61.5	76.6	73.7
7⅞	66.6	72.4	24.6	81.5	64.6	80.4	78.5
8	70.0	76.0	25.8	85.7	68.0	84.5	81.4
8⅛	73.2	79.6	27.1	89.8	71.1	88.5	85.1
8¼	76.7	83.4	28.4	94.0	74.5	92.6	89.2
8⅜	80.0	87.0	29.6	98.0	77.8	96.6	93.1
8½	83.7	91.0	31.0	103	81.4	101	97.5
8⅝	87.5	95.0	32.4	107	85.0	106	102
8¾	91.5	99.5	33.8	113	88.8	111	106
8⅞	95.5	104	35.3	118	92.5	116	111
9	99.5	108	36.8	122	96.5	120	115
9⅛	104	113	38.3	127	100	125	120
9¼	108	117	39.8	133	105	131	125
9⅜	112	122	41.5	138	109	136	130
9½	117	127	43.2	144	114	142	136
9⅝	122	132	45.0	149	118	147	141
9¾	127	138	46.8	155	123	153	147
9⅞	131	143	48.5	161	127	159	153
10	136	148	50.4	167	132	165	159
10⅛	141	154	52.4	173	137	171	164
10¼	147	159	54.3	180	142	178	170
10⅜	152	165	56.2	186	148	184	177
10½	158	172	58.3	194	153	191	184
10⅝	164	178	60.4	201	159	198	190
10¾	170	184	63.0	209	165	206	197
10⅞	175	191	64.8	215	170	212	204
11	182	197	67.0	223	176	220	211
11⅛	188	204	69.5	231	182	223	218
11¼	195	212	71.9	239	189	236	226
11⅜	201	218	74.3	246	196	243	234
11½	208	226	76.6	256	202	252	241
11⅝	216	234	79.5	264	208	260	250
11¾	221	240	81.5	272	215	268	257
11⅞	228	248	84.3	280	222	276	266
12	236	256	87.0	289	229	285	274
12¼	251	273	92.6	307	243	303	292
12½	267	287	98.5	323	259	319	307

Weight of Ball or Sphere When Cast in

Dia. in in.	Cast iron	Steel	Aluminum	Copper	Zinc	Gun metal	Yellow brass
12¾	283	308	105	347	274	342	328
13	300	326	111	367	291	362	348
13¼	315	344	117	388	308	383	369
13½	335	364	124	411	326	405	390
13¾	355	386	131	435	344	429	413
14	374	407	138	458	363	452	435
14¼	395	429	146	484	383	477	459
14½	416	452	154	509	404	502	484
14¾	438	476	162	538	425	530	509
15	460	500	170	564	447	556	535
15¼	484	525	179	592	470	584	562
15½	507	552	188	623	493	614	590
15¾	534	580	197	654	518	645	620
16	560	609	207	686	543	676	650
16¼	586	636	217	717	568	707	681
16½	613	666	226	751	595	740	712
16¾	641	696	237	786	622	775	745
17	670	729	248	822	650	810	780
17¼	700	760	259	858	681	846	815
17½	732	795	270	897	710	884	850
17¾	764	829	282	935	741	922	887
18	795	864	294	974	772	960	924
18¼	830	901	307	1,013	806	1,001	965
18½	864	938	320	1,058	839	1,044	1,002
18¾	900	977	332	1,102	873	1,088	1,045
19	936	1,013	346	1,149	909	1,130	1,088
19¼	974	1,058	360	1,190	945	1,173	1,130
19½	1,012	1,100	375	1,240	983	1,224	1,178
19¾	1,051	1,142	389	1,290	1,021	1,270	1,220
20	1,091	1,188	404	1,340	1,060	1,320	1,270
20½	1,178	1,278	435	1,441	1,140	1,420	1,363
21	1,262	1,371	467	1,549	1,225	1,525	1,467
21½	1,360	1,475	503	1,665	1,318	1,641	1,580
22	1,453	1,580	538	1,781	1,411	1,758	1,690
22½	1,555	1,689	575	1,908	1,509	1,880	1,810
23	1,662	1,808	614	2,040	1,611	2,005	1,930
23½	1,770	1,920	654	2,166	1,718	2,140	2,054
24	1,885	2,048	696	2,310	1,828	2,280	2,188

Highest Quality Steels
MADE WITH VANCORAM FERRO VANADIUM

The high quality of Vancoram Ferro Vanadium, consistent from lot to lot, assures the steelmaker closer control during production and a finished product of unexcelled microstructure and physical properties. The alloy is produced in the following grades to meet the requirements of various products and manufacturing technics:

	Typical Composition
GRADE "A" *(Open Hearth)*	Vanadium . . . 35-40% Silicon . . . . max. 12% Carbon . . max. 3.50%
GRADE "B" *(Crucible)*	Vanadium . . . 35-45% Silicon . . . max. 3.50% Carbon . . max. 0.50%
GRADE "C" *(Primos)*	Vanadium . . . 35-45% Silicon . . . max. 1.25% Carbon . . max. 0.20%
HIGH V GRADES	Vanadium . . . 50-55% 60-65% 70-80% Silicon . . . . . Low Carbon . . . . . Low

Large stocks are carried of all grades of alloys, and they can be supplied in any of the standard lump, crushed, or mesh sizes.

Our metallurgists will be glad to assist you in the application of Vancoram Ferro Vanadium to meet your specific requirements.

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SIGNIFICANT FOUNDRY DATA

In Census of Manufactures

By OWEN C. GRETTON
Chief, Metals and Metal Products Section
Industry Division, Bureau of the Census
Washington

THE first comprehensive picture of our manufacturing economy since World War II is now being made available in a series of releases by the United States Bureau of the Census. These releases present data covering the year 1947 for approximately 460 individual industries and for geographic divisions, states, industrial areas, and important industrial counties.

Preliminary results indicate that the statistics will disclose many startling and significant changes in the importance of different commodities and industries and in the geographic location of manufacturing plants from the last Census of Manufactures which covered the prewar year of 1939. The number of manufacturing plants alone has increased from approximately 180 thousand in 1939 to approximately a quarter of a million in 1947. In addition to providing extremely useful comparisons with the prewar situation of 1939, the Bureau has obtained, in 1947, new information of a type and character never before available.

Many of these additional inquiries will be of special interest to foundrymen. To begin with, there will be a complete story for the first time of captive foundries, i.e., those operated as a department of a plant producing finished products for sale. The reporting forms, which were used by the plants in the approximately 110 metalworking industries, included an inquiry as to whether the plant maintained a foundry and, if it did, requested the usual number of production workers employed in the foundry and the approximate number of days that the foundry was operated during 1947. Foundries were distinguished from die-casting departments and a similar inquiry was asked as to the operation of a die-casting facility in the plant.

Plants indicating that they maintained a sizable foundry or die-casting operations, i.e., with fifty or more production workers employed, were mailed a more detailed form on which they reported their output of castings by type, input of metal, total wages and salaries paid to factory workers during 1947, and the number of workers employed in the department as of the mid-month of each of the four quarters of the year. When these reports are tabulated and added to the figures for commercial foundries, there will be provided a total national picture of foundry output and foundry employment, both captive and commercial.

More information will be available on the usage of castings than in any previous peacetime year. The plants in the 110 metalworking industries previously mentioned were requested to report the tons and dollar value of iron, steel, aluminum, and brass castings that they consumed during 1947, provided that their usage exceeded (a) 50 short tons for iron and steel castings and (b) 10 tons for aluminum and brass castings. The use of a quantity cut-off for reporting relieved numerous small consumers of the necessity of reporting quantity and cost data while having only an inconsequential effect on the total coverage of casting usage. Nevertheless, even these very small consumers were required to indicate whether they did not consume any castings or consumed some, but less than the stipulated quantity limits of 50 tons and 10 tons. Figures will be shown separately for each of the four types of castings — iron, steel, aluminum, and brass—for each of the 110 industries and for geographic divisions and states.

Published In Separate Releases

The Bureau of the Census will publish the industry and state information in a series of separate releases. The industry data which will be released first will be issued initially in the form of a preliminary release for each industry. This preliminary release will contain general statistics for the United States, covering number of establishments, employment, payrolls, man-hours worked, value added by manufacture and, in most instances, detailed product data.

About a month after the preliminary release, a final report covering a group of related industries will appear. This final report will be much more comprehensive than the preliminary release and will contain geographic division and state information and size of plant data as well as statistics on inventories, capital expenditures, employment by functional class and sex, fuel consumed, etc. Statistics relating to commercial foundries will be contained in two final Census reports, one covering the three industries—gray iron foundries, malleable iron foundries, and steel foundries—and the other covering nonferrous foundries.

The information on the usage of castings by metal fabricating plants and the maintenance of captive foundries by those plants will be contained in each of the final reports for 110 industries mentioned previously. The more detailed data on captive foundry activity will be published in a separate release entitled "Foundry Department Operations," which will be available at a later date.

(*Concluded on page* 145)

DISPLAY: Northern Ohio Management Group of Gray Iron Founders' Society is sponsoring a display of gray iron products at Case Institute of Technology, Cleveland. It consists of unfinished and machined castings, and sample cores and cut-away sections intended to present a clear idea of what gray iron castings are, how they are made and how they are used. The exhibit is under the direction of a committee headed by Walter Seelbach, president, Superior Foundry Inc., and John M. Price, president, Ferro Machine & Foundry Co., both of Cleveland. The entire exhibit will be changed twice during each school year

HOW TO

- Get Quicker, Cleaner Parting
- Produce Smoother Castings
- Reduce Foundry Smoke

Whether you cast in sand, permanent molds or dies, **"dag"** colloidal graphite can help you.

Chill coating materials made with **"dag"** colloidal graphite dispersions form dry films of graphite that resist oxidation, minimize gas pockets and permit easy removal of the chill.

When sprayed or brushed on patterns, dies and permanent molds, **"dag"** dispersions form a micro-thin film that insures rapid, clean parting and smooth casting surfaces. The coating is so thin that castings are kept to close tolerances.

Whatever the casting temperature, you will reduce or eliminate choking fumes and smoke by using aqueous **"dag"** dispersions . . . a break for the men in the shop. **"dag"** colloidal graphite also eliminates binding and stripping when applied to screw threads, flask pins, etc.

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C-14

Refractory CEMENTS for melting non-ferrous metals

For melting all non-ferrous metals — in pit furnaces, direct arc type rocking furnaces, induction and high frequency furnaces — Norton Company has a complete line of high temperature cements and prefired shapes. For example:

RC 1188 — a silicon carbide mixture for ramming into oil or gas fired reverberatory and pit furnaces melting aluminum (also copper and zinc).

RM 1169 — a fused magnesia cement for lining Ajax-Northrup high frequency furnaces melting nickel-chromium alloys.

RA 889 — a fused alumina mixture for lining burner tunnels in gas or oil fired billet heating, heat treating and annealing furnaces.

RM 1140 — a fused magnesia cement for rammed linings in Ajax-Wyatt low frequency vertical ring induction furnaces melting high copper alloys, and cupro-nickel, nickel-silver and cadmium-bronze alloys.

NORTON COMPANY
Worcester 6, Massachusetts

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REFRACTORIES

(*Concluded from page* 142)

A complete list of the pamphlets and volumes of the 1947 Census of Manufactures is now available in a leaflet recently prepared by the Bureau of the Census. This leaflet, which also notes the price of each publication, can be used to order the pamphlets or volumes desired. Requests for the leaflet should be addressed to the Bureau of the Census, Industry Division, Washington 25.

JOINT TECHNICAL SESSIONS

Scheduled for AFS Convention

TECHNICAL sessions scheduled for the 53rd annual convention of the American Foundrymen's Society in St. Louis, May 2 through 5, will include two joint meetings to be held by the ferrous divisions. Of particular interest is a symposium on nodular graphite cast iron which will be a joint session of the gray iron and malleable groups. This is scheduled for Tuesday afternoon, May 3.

On Thursday afternoon, May 5, a joint session sponsored by the gray iron and steel divisions will be devoted to the subject of metal flow in molds employing different types of gating systems. This year, also for the first time, a gray iron round-table luncheon will be held.

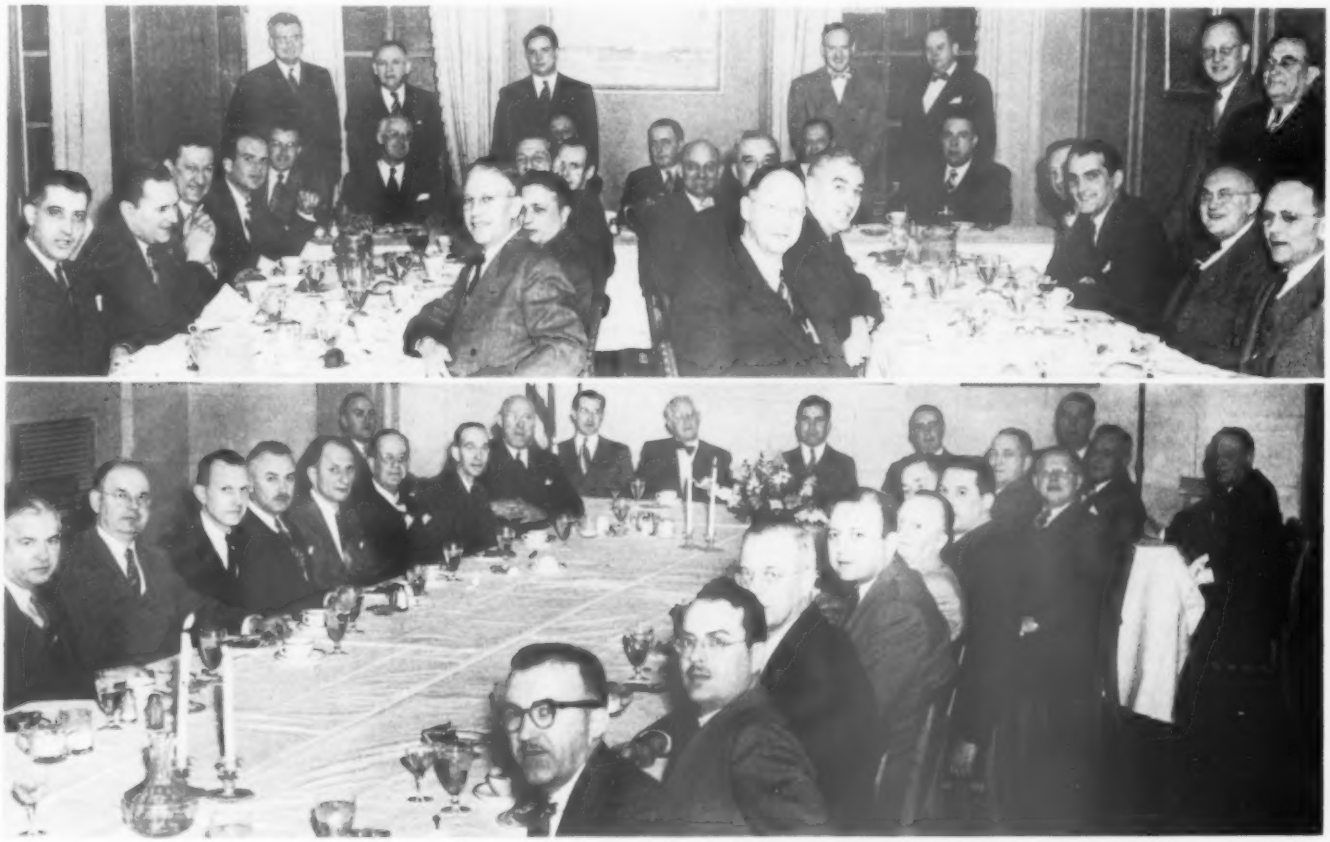
The gray iron shop course, to be conducted Monday, Tuesday and Wednesday evenings, will have the following subjects and speakers on its program: "Inexpensive Tests for the Small Gray Iron Foundry," with Walter Bohn, Buick Motor Division, Flint, Mich., as discussion leader; "Carbon Trends in Gray Iron," with W. W. Levi, Lynchburg Foundry Co., Radford, Va., leading the discussion; and a panel discussion on "Sources of Metal Losses in the Foundry." Five well qualified foundrymen, headed by James Bernard, Buick Motor Division, will make up the panel.

Discussion subjects for the sand shop course, also to be held the first three evenings of the convention, are: "Penetration," "Resin Bonded vs Oil Bonded Cores" and "Core Blowing."

The complete convention program is expected to be announced shortly. One recent change is the scheduling of the AFS Chapter Officers and Directors meeting as a luncheon with the society's national directors, on Wednesday noon. Originally this was planned as a dinner Tuesday evening. The Canadian dinner continues as scheduled for Tuesday evening.

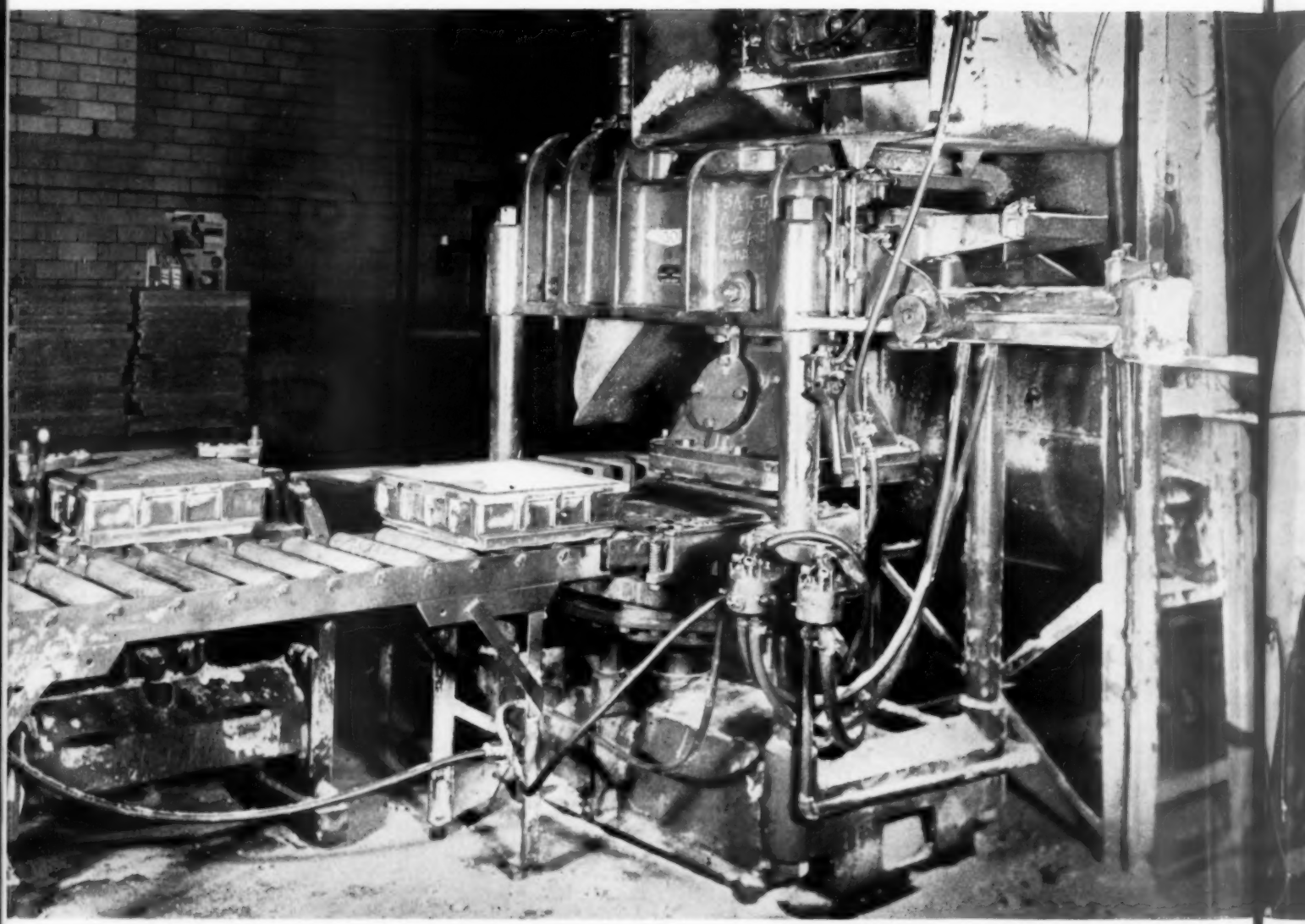
Admission to all sessions at the St. Louis convention will be by badge only, upon payment of registration fees, which are $5 for members and $7.50 for nonmembers. The additional charge to nonmembers can be converted and applied to cost of membership in the society at the time of registration.

Southwest Pattern & Foundry Co., Fort Worth, Tex., has been incorporated with capital stock of $10,000. Incorporators are R. P. McCluney, Eugene McCluney and C. W. Bunch.



NFA REGIONAL MEETINGS: Views of regional meetings held by the National Foundry Association at Cleveland (bottom) Jan. 20 and at Chicago (top) Feb. 3. Association President Franklin Farrel III presided at the Cleveland meeting and I. R. Wagner, past president, was chairman at Chicago. At each meeting L. E. Roark, executive vice president outlined current Washington activities of the NFA and discussed various other subjects pertaining to business and trade relations concerning the foundry indu try

You can cut core costs with *OSBORN* core blowing machines!

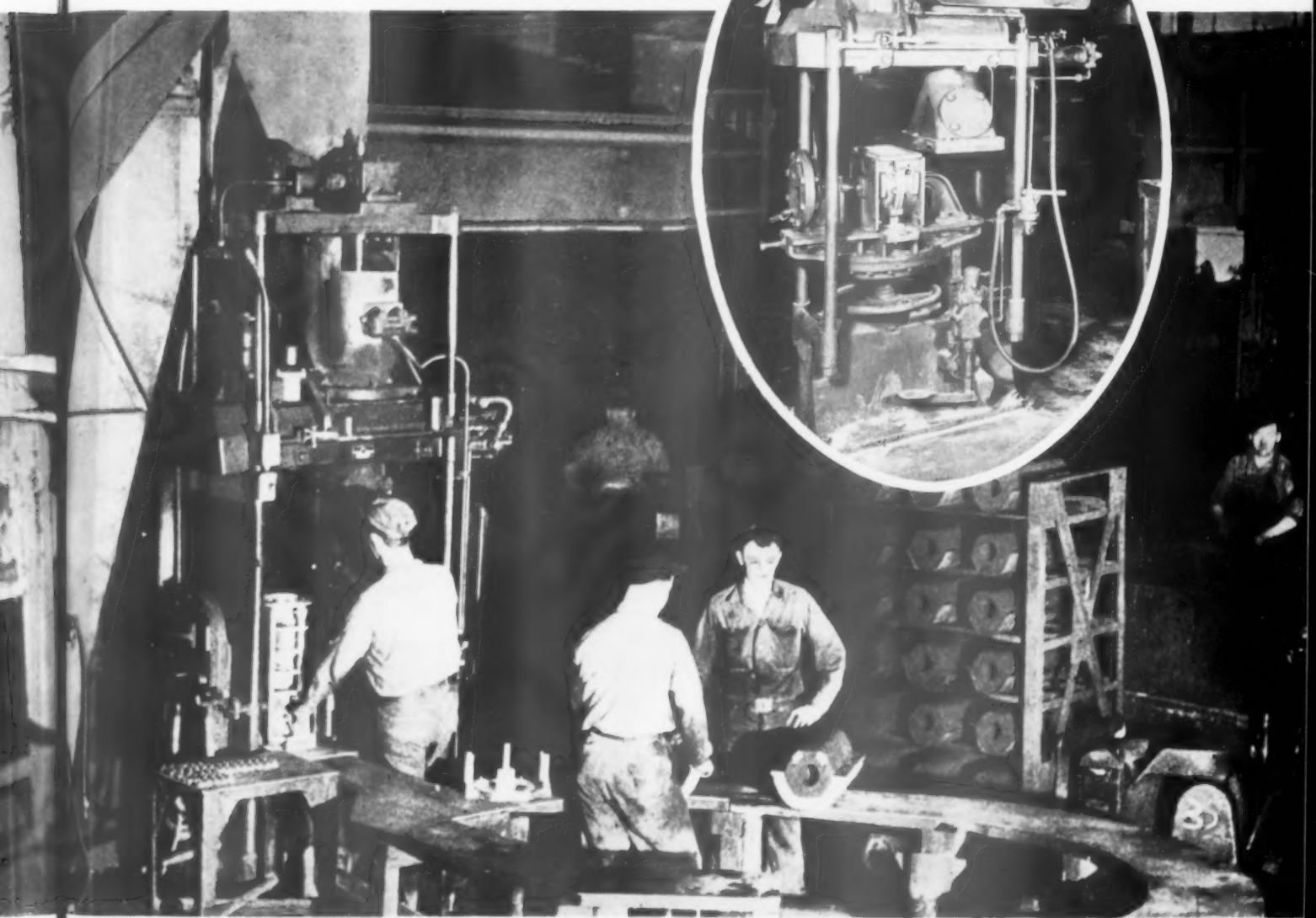


Osborn Core Blower with conveyor roller frame mounted on table.

THE OSBORN MANUFACTURING COMPANY
5401 Hamilton Avenue Cleveland, Ohio

CORES blown on Osborn Core Blowing Machines are of uniform strength and quality, and *rammed in a matter of seconds!* Made in both diaphragm and draw types, Osborn Core Blowing Machines are furnished complete with sand reservoir and blow plates to meet the individual needs. Conveyor roller frames mounted on the table for ease in handling large core boxes and operating valves can be supplied as optional equipment. To help *you* cut production costs an experienced Osborn engineer will be glad to analyze your particular core requirements. Why not contact us—today?

Osborn Core Blower showing horizontal clamps for vertically split core boxes.



Osborn Core Blower equipped with core sand feeder.

OSBORN

MOULDING MACHINES

CORE BLOWING MACHINES

MEMBER MANUFACTURER'S ASSOCIATION, INC. FOUNDRY EQUIPMENT

Cyanide Heat Treatment

Gives Wear Resistance to Cast Parts

By Z. T. CRITTENDEN
Chief Metallurgist
Pontiac Motor Division
Pontiac, Mich.

CAMSHAFT sprocket gears for Pontiac 6 and 8-cylinder engines are of gray cast iron, and to overcome occasional instances of excessive wear on the gear used in the 6-cylinder engine a cyanide heat treatment sequence was developed to insure a minimum of 40 Rockwell C hardness on the teeth. Gears are of so-called cylinder iron, with hardness range 163-207 brinell. Chemical specifications call for: 3.10-3.40 per cent total carbon (0.50-0.60 combined carbon), 0.55-0.75 manganese, 2.15-2.35 silicon, 0.07-0.15 nickel, 0.15-0.25 chromium, and 0.20 maximum sulphur and phosphorus. Routine test bar checks show hardness in the 217-255 brinell range and tensile strength on the order of 32,000 psi.

Gear blanks are cast flat, four in a mold, and after being shaken out and cleaned are normalized at 1650° F for several hours to relieve any casting stresses. Machining operations follow, the 42 teeth being hobbed on six gears at a time, the bore being faced and machined and keyway cut. The gear weighs 1.8 pounds finished, measures about 5½ inches outside diameter, with teeth ¾-inch wide and three equispaced openings cast in the web.

After machining, the gears are transferred to the heat treating department where two conventional butane-fired cyanide pots are operated. The gears are stacked on steel spikes or spindles, ten to a fixture, and each furnace accommodating four stacks. They are heated in the cyanide salt for 35 minutes at 1600° F, quenched in an adjoining oil bath and drawn back in a furnace at 500 degrees for one hour to bring Rockwell hardness in the 45-50 range.

Temperature of the cyanide was purposely set 50 degrees below the normalizing temperature and the time in the cyanide gaged to yield

(*Concluded on page* 150)

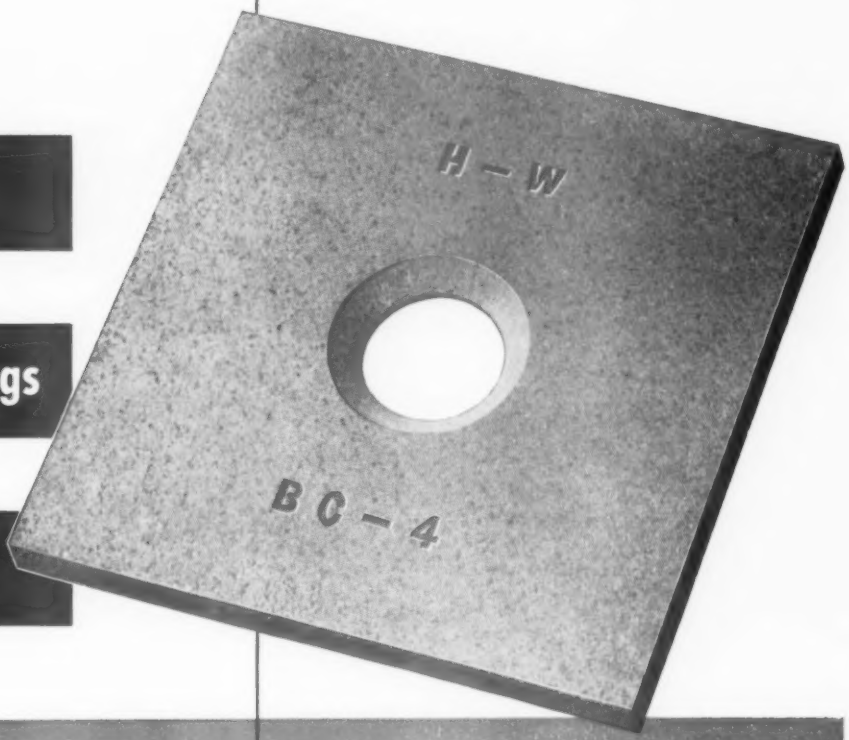
Fig. 1 — Placing cast gears in cyanide bath. Fig. 2—Quenching in oil bath. Fig. 3—Third operation is a wash prior to unloading gears (Fig. 4) for the tempering operation

H·W Refractory Breaker Core Shapes

reduce your costs

improve your castings

speed production



YOU can have necked-down risers without core boxes, patterns or baking, by using Harbison-Walker ready-made, refractory Breaker Core Shapes. Made of burned refractories, they contain no combustible or volatile materials. Thus, one source of troublesome core gas in the mould is eliminated.

The use of Harbison-Walker Breaker Core Shapes saves hours of time, produces cleaner castings, reduces labor. Various sizes are provided—to fit every foundry need. They produce a smooth, hard surface on the casting, and a necked-down area in the riser that permits its fast and easy removal.

The sizes you need

Harbison-Walker Breaker Core Shapes are available in ten sizes, for risers of 2 to 12 inches in diameter. These sizes were developed in cooperation with Technical Research Committee of the Steel Founders' Society of America. They are durable, and will withstand considerable rough handling. Packed in convenient cartons, ready for use. Readily stocked in all needed sizes. Write for bulletin giving complete data.

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REFRACTORIES COMPANY *and Subsidiaries*
GENERAL OFFICES · PITTSBURGH 22, PA.

WORLD'S LARGEST PRODUCER OF REFRACTORIES

Fig. 5—Work being placed in tempering furnace. Fig. 6—After being drawn and cooled the gears are blasted to remove cyanide-oil coating

(*Concluded from page* 148)

uniform hardness from the teeth to the bore. If there is a hardness differential between the two extreme points on the gear it will warp and have to be rejected. Thus a close watch is kept on the hardness to avoid warpage. Resultant cyanide case depth is 0.003-0.005-inch, ample to insure good wearing qualities but not enough to cause internal stresses to be set up within the casting.

After being drawn and cooled the gears are grit blasted in machines to remove the cyanide-oil scum. They need to be clean since the final grind on the bore is located from the teeth and any surface contamination on the teeth would throw off proper locating in grinding.

The entire operation is fairly rapid and requires a minimum of space and equipment. Since the Pontiac 6-cylinder engine constitutes only about 35 per cent of total engine production and daily new new car output is approximately 1100, even with the addition of service requirements there is needed only around 500-600 heat treated gears daily. Hence it is the usual practice to wait until several days' requirements have accumulated before starting heat treatment, assuming of course sufficient quantities have been scheduled through foundry and machining departments.

MALLEABLE FOUNDERS' SOCIETY

Holds Semi-Annual Meeting

By WILLIAM G. GUDE
Managing Editor
THE FOUNDRY

SEMI-ANNUAL meeting of the Malleable Founders' Society was held in Cleveland, Jan. 14, with approximately 40 member companies represented. Collins L. Carter, society president and president-general manager, Albion Malleable Iron Co., Albion, Mich., presided.

The program was opened with reports by various committees and staff officials. Lowell D. Ryan, managing director of the society, presented an interesting comparison of malleable castings production and that of competitive products. Frank O. Parker, Dayton Malleable Iron Co., Dayton, O., chairman of the Committee on Publicity and Market Development, reported that the society's new motion picture is nearing completion and would probably be ready for public showing in April. Ralph J. Teetor, Cadillac Malleable Iron Co., Cadillac, Mich., reported on the activities of the Plant Operations Committee, and James H. Lansing, technical and research director, presented a discussion on metallurgical developments.

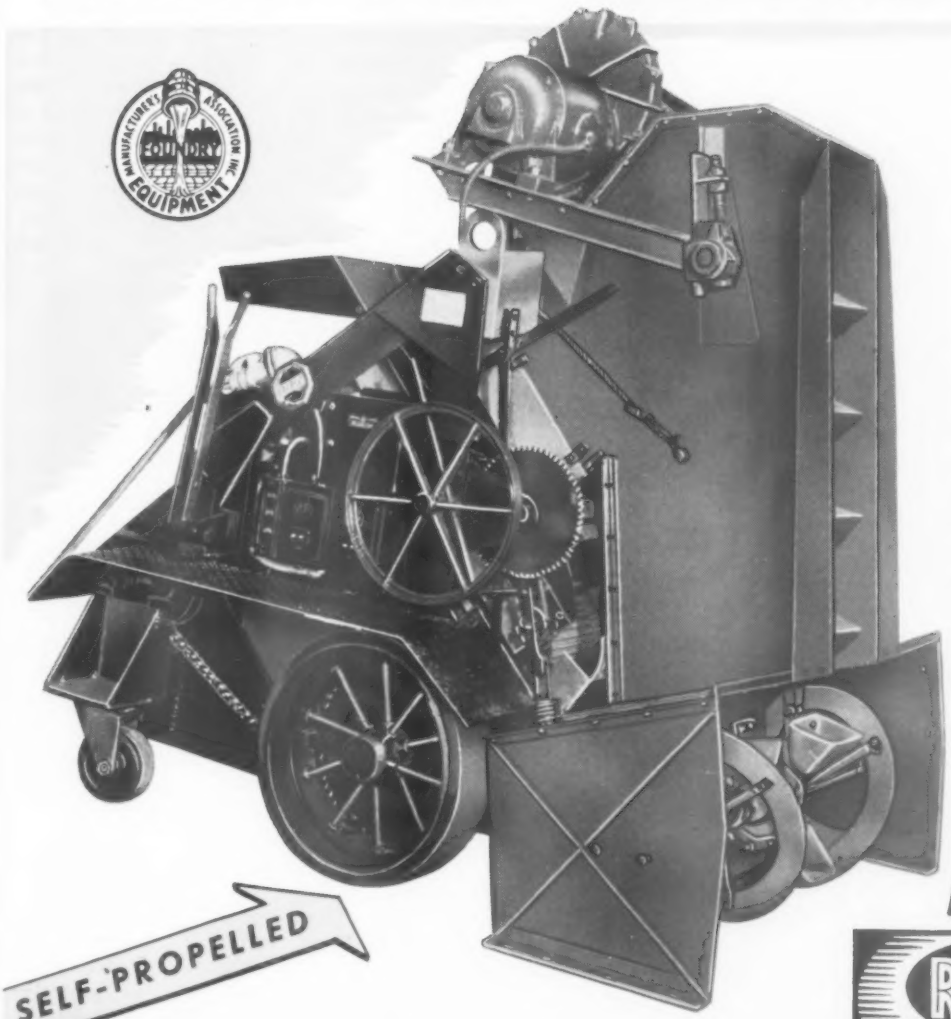
Mr. Lansing described experimental work in production of nodular graphite gray iron through additions of cerium and magnesium. He indicated that the product offers considerable promise for certain applications and could be competitive with some types of pearlitic malleable iron from the quality standpoint. Economic considerations of course enter the picture, since the recent cost of the additions necessary to produce the nodular graphite structure ranges from $54 to $130 per ton.

Other subjects discussed by Mr. Lansing were manganese-sulphur ratios in malleable iron, and a new type cupola spark arrestor. Experience has shown development of improved physical properties with manganese additions to high-sulphur iron, satisfactory results obtaining with use of the formula for manganese content of twice the sulphur plus 0.15 per cent. With duplexed-metal sulphur content sometimes as high as 0.20 to 0.25 per cent, resulting from the use of high-sulphur coke and substantial amounts of scrap, there has been a tendency on the part of some producers to run with manganese content of less than the generally accepted value of twice the sulphur content plus 0.15 per cent. Manganese values of twice the sulphur plus 0.05 per cent frequently

(*Concluded on page* 152)

Great Day!

The New ROYER SAND CONDITIONER *is here*



It's a happy day for everyone in the foundry when the new *self-propelled, self-loading* ROYER arrives. It means the end of wasteful, unnecessary drudgery in sand preparation . . . it means you can now get up to 50 tons per hour of perfectly blended, evenly graded, fluffy, thoroughly aerated molding sand. The Royer Self Loading Sand Conditioner handles the entire job automatically, even down to rejection of burnt cores and other trash. Write us for all the facts.

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SELF-LOADING

ROYER

FOREMOST IN SAND CONDITIONING EQUIPMENT

ROYER FOUNDRY & MACHINE CO.

159 PRINGLE ST., KINGSTON, PA.

(*Concluded from page* 150)

have been encountered. To check the desirability of this practice, experiments were conducted in co-operation with several member companies. The results of these comparative tests, as reported by Mr. Lansing, definitely indicated the desirability of maintaining a manganese content of twice the sulphur plus 0.15 per cent, rather than a lower plus value, even with sulphurs of 0.20 or 0.25 per cent.

The cupola spark arrestor described is the design of Emil A. Piper, Pohlman Foundry Co., Buffalo. Developed to have low first cost and economical operation, it makes use of a water spray directed from the top of a 12-ft-high cylinder 76 in. in diameter mounted on top of a 56-in. cupola. Discharged water and entrapped material are directed into the slag trough for disposal. The design is said to be regarded favorably by municipal hygiene officials.

Concluding speaker of the morning session, was Dr. Robert S. Hartman, executive secretary, Council of Profit-Sharing Industries, Columbus, O. In his discussion of "Profit Sharing and the Free Enterprise System," he stated that technical research has overlooked the resources of the individual, although human resources need and warrant as much development as do natural resources. Profit sharing by industry, he maintained can do much to expand and strengthen the free enterprise system.

Describing profit sharing as any procedure under which all employees receive, in addition to good regular pay, special current or deferred sums, Dr. Hartman explained various types of plans. These include direct payments calculated as a certain percentage of the company's profits; wage dividends based on the amount of dividends paid stockholders; the stock ownership plan under which the company bears all or part of the cost; and trust plans which accumulate sums for retirement payments. Indirect payment plans include the so-called annual wage; the regulation of payrolls as a percentage of sales, a sharing in cost savings; and the co-operative plan in which employees are both co-owners and co-managers.

A plea for the promotion of foundry educational programs was made in a talk by James H. Smith, general manager, Central Foundry Division, General Motors Corp., Saginaw, Mich. Such programs, he stated, are needed for three broad reasons: 1. To acquaint more students in the engineering schools of the advantages of using cast materials by getting the schools to include foundry educational programs as part of their curriculum. 2. To build up our supervisory personnel by encouraging better trained young men to come into the industry and to give further training to the supervisors we now have. 3. To attract young engineers into the industry to speed up the developments of the many projects we should be working at vigorously to keep abreast of competing industries. Mr. Smith discussed these points in detail, and he then outlined what work is being done by various organizations in foundry educational activities.

Accelerate the Programs

In regard to what individuals or groups can do to help accelerate the programs, the speaker urged: Encouraging high schools and vocational schools to give greater attention to foundry sequences, particularly in areas where there is a large concentration of foundry employees. 2. Sponsoring of night or extension courses for people already in the industry so that they may improve themselves. 3. Promoting chapter-university, regional joint conferences and training programs for members of the industry. 4. Encouraging young men to enter the Foundry Educational Foundation program. 5. Sponsoring more plant visitations by educators and students in their junior and senior years in high schools or vocational schools.

In discussing the business outlook for 1949, Dr. Leo Woldman, professor of economics, Columbia University, New York, stated there are indications that the peak of the boom has been passed but that future problems can be minimized if real understanding can be realized between government, labor and industry. He decried the general lack of knowledge concerning the operation of our competitive system.

FEF COMMITTEE: Shown at the dinner held during the meeting of the Technical and University Advisory Committee of the Foundry Educational Foundation, at Cleveland Feb. 2. Top row, left to right: George K. Dreher, Foundry Educational Foundation; Walter L. Seelbach, Superior Foundries Inc., Cleveland; R. L. Collier, Gray Iron Founders' Society Inc.; Prof. John Wulff, Massachusetts Institute of Technology; Prof. E. C. Wright, University of Alabama; Prof. George J. Parker, University of Wisconsin; Prof. Peter E. Kyle, Cornell University; Frank Steinebach, THE FOUNDRY; Prof. K. H. Donaldson, Case Institute of Technology. Second row, left to right: Fred E. Westerman, University of Cincinnati; George Miller, Osborn Mfg. Co., Cleveland; Charles E. Walton, Case Institute of Technology; Charles O. Burgess, Gray Iron Founders' Society; James H. Lansing, Malleable Founders' Society Inc.; Lowell Ryan, Malleable Founders' Society Inc. Third row, left to right: M. T. Rowley, Case Institute of Technology; Richard W. Heine, University of Wisconsin; Prof. G. M. Cover, Case Institute of Technology; Everett G. Fahlman, Permold Co., Medina, O.; Richard W. Cole, Northwestern Technological Institute. Also at the meeting were: Leslie C. Thelleman, Steel Founders' Society of America; C. W. Briggs, Steel Founders' Society of America; S. C. Massari, American Foundrymen's Society.

NEW!
DoALL HIGH-SPEED BANDSAWS
Four 36" models at low cost, specially built for...
FOUNDRIES
SHEET-METAL SHOPS
WOODWORKERS
DoALL, known for many years as the world's headquarters for precision bandsaws, now offers four 36" high-speed models in the low-cost range, to meet the special requirements of foundries, sheet-metal shops and woodworkers.
They are available in set speeds of 2,000 to 10,000 fpm., direct or belted drive; or in variable speeds of 1,000 to 5,000 or 2,000 to 10,000 fpm., with Speedmaster drive. Cast-iron or aluminum wheels on Timken roller-bearing spindles. Two-way tilting table; high-speed, double-insert-type saw guides with large anti-friction thrust bearings. Cut by formchec with foot-operated, hydraulic brakes for both wheels. Throat capacity 35½"; work-height capacity 25" under saw guide and 16" at column. Blade capacity up to 2" wide. Write for complete information.
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A BLADE FOR EVERY PURPOSE
Iron...Steel...Copper...Brass...Aluminum
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Man-to-Man

ON THE MOLDER'S BENCH

"And Now, Order Shortages"

By RALPH L. LEE

ON my last several trips I noticed that the sales people I've been running into are sort of girding up their loins and getting ready to barge out again into the territory with blood in the old eye. From what they say I take it that a lot of them are pretty much out of practice. They are taking sales sitting-up exercises, blowing the dust off the sales manuals and getting the boys from the department together to find out where do we go from here, how and when do we go, and what to do when when we get there.

These sales people I'm talking about aren't in the foundry business; in fact, now that I think of it, I don't believe that any of the many foundry people I meet have talked to me about the sales plans they are cooking up. Of course, this doesn't mean that they haven't been doing any cooking, but on the other hand one would imagine that if there was much of it going on I'd hear about it at least once in a while. I sure did hear plenty about coke, pig iron and scrap shortages some while back.

I know, of course, that the few order backlogs left over are getting punier and punier and that some foundries (quite a few in fact) have had to trim their sails. The strange thing to me is that the folks who have told me about this situation don't seem to be terribly down in the dumps. In fact, I sort of get the feeling that they don't mind a little breathing spell after the terrific struggle they've been through. In a way I don't blame them.

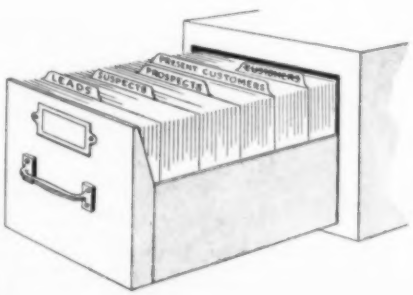
There's one angle though that jolts me a bit, not that it is important if I do get a jolt or not (after all I'm just a rank amateur running the one-man LEE HOBBY FOUNDRY), but as I was saying, the thing that puzzles me is that some of these foundry folks act as though they really did believe Confucius had a point and have decided to relax with as much satisfaction as possible.

But I do know this—in the lines of manufacturing and marketing where I have been brought up, we were taught at an early age never to admit that business happens to us like cyclones, earthquakes, floods and other acts of God. Even though business showed some of the earmarks, we were taught that sales had to be manufactured just as the things we sold had to be manufactured. Sales that fell into our laps, while acceptable, just didn't count.

Maybe I'm clear out of order comparing highly competitive specialty selling procedures with those suitable for the foundry, but I don't see how it can do any harm. In fact I think it would be fun to pretend that my little pewee foundry—LEE CAST PRODUCTS—had decided to hire a sales promotional manager (that would be me) and that we were now right in the middle of planning a campaign to get more than our share of hard-to-get business. Having been a sales promotional manager I think I know how we would go at the job.

Before we even thought of sales as such, let alone advertising, we would sit down and go over our products with a fine-tooth comb for the purpose of discovering what they had in the way of features that the products of our competitors did not have God only knows there ought to be some reason for being in business.

But if, after using even our most powerful microscope, we could not find one single feature of superiority, we would lay off the sales promotional manager and get busy on the cost of production. We would leave no stone unturned to get every fraction of a penny out of expenses.



If we found that, try as we might, there was no way under the sun to cut cost, we'd swing back to the product again, and this time do or die. We'd look over the castings we were turning out with an eagle eye for finish. We'd give cleaning the old one-two-three. We'd check up on the scrap that had been sneaking into our customers' hands when our back was turned. We'd go over our records for determining our batting avevage as to delivery dates made good in comparison with promises made.

Maybe we'd figure out some slick way of favoring priority orders over those which could just as well take their turn. We might even look into better ways of boxing or crating the products and speeding up their trip from our shipping platform to the receiving platform of our customers. There are a lot of things we could tackle all to the end that when we got through we'd know darned well we did have something worth shouting about that would stand up against any competitor.

Next we would see to it that every one of us who is called upon to deal with customers, prospects or suspects knew every single feature of our products and services, forwards and backwards, and was able to get them into the heads and believed in by everybody who should know—even though this meant memorizing the whole list.

Now after we were loaded for bear we would take a list of every one we had been doing business with for years back, particularly those who had gotten away from us.

After this was done we would make

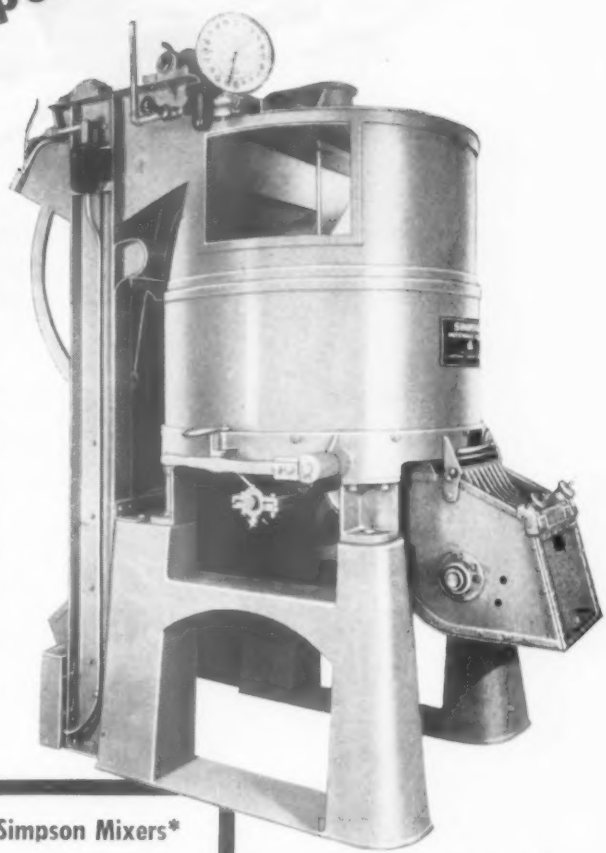
(*Concluded on page* 157)

GREATER CAPACITY

in TONS

per batch...
per hour...
per day...

When it comes to turning out more tons of properly conditioned and cooled sand, with resulting high mold capacity per working day, you just can't beat the high efficiency of SIMPSON MIXERS. Yet with this high productive capacity, you actually require fewer mixing cycles per hour, because of the large batch capacity of the mixers. Thus, with greater capacity and fewer mixing cycles, you have ample time to take frequent sand samples, to accurately determine and improve sand quality for a net result of more good castings at lower cost.



ABOVE: Typical No. 2 SIMPSON MIXER unit, with NATIONAL Bucket Loader, Aerator and Water Meter. LEFT: No. 3 SIMPSON MIXER preparing backing and facing sands in foundry of a large machine tool manufacturer.

** Rated batch capacities of SIMPSON MIXERS are not theoretical figures . . . they are proved on the job in hundreds of large and small foundries all over the world. Ask to have a National Engineer show you how to increase production, improve quality and lower cost.*

Batch Capacities of Simpson Mixers*

No. 3½ Mixer	5000 lbs.
No. 3 Mixer	3000 lbs.
No. 2 Mixer	1500 lbs.
No. 1½ Mixer	700 lbs.
No. 1H Mixer	400 lbs.

**Based on actual practice in hundreds of foundries.*

SIMPSON Intensive MIXERS

NATIONAL *Engineering Company*

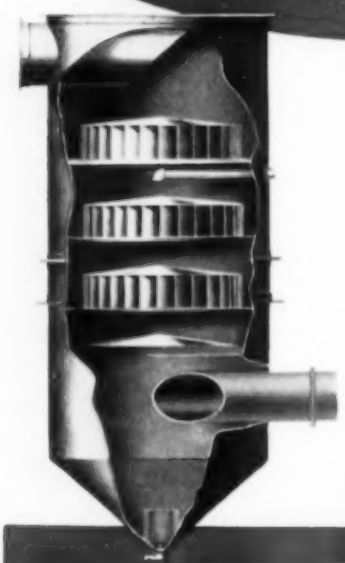
608 Machinery Hall Bldg. • Chicago 6, Illinois

Manufacturers and Selling Agents for Continental European Countries—The George Fischer Steel & Iron Works, Schaffhausen, Switzerland. For the British Possessions, Excluding Canada and Australia—August's Limited, Halifax, England. For Canada—Dominion Engineering Co., Ltd., Montreal, Canada. For Australia and New Zealand—Gibson, Battle & Co., Pty., Ltd. Sydney, Australia

"SW" WET METHOD CUPOLA
Creates
"GOOD NEIGHBOR" POLICY

MANUFACTURER'S ASSOCIATION, INC. FOUNDRY EQUIPMENT

MELTING DEPARTMENT
Smoke and Dust
NUISANCE GONE



You gain two valuable advantages by installing a Schneible System in your foundry. By removing the fly-ash nuisance from the plant premises and neighborhood, you save clean-up work and deterioration of roofs, gutters and other facilities. The foundry is a much better "Neighbor" in the community!

The cupola fly-ash is collected as a sludge in the re-circulating tank so that it can be removed from the plant instead of becoming a nuisance.

The same water that collects this fly-ash can be used to quench the slag and sluice it back to the re-circulating tank for disposal in the same manner.

In addition a small Multi-Wash Collector can also be used for the collecting and removal of slag wool from behind the cupolas.

Easy to operate. Efficient. Minimum maintenance.
(U.S. and Foreign patents applied for.)

CLAUDE B. SCHNEIBLE COMPANY
2827 Twenty-Fifth Street • Detroit 16, Mich.

Free

Check into the substantial savings possible in your plant. Write for a copy of "Schneible in the Foundry Industry"—Bulletin No. 47.

SCHNEIBLE

(*Concluded from page* 154)

a list of every outfit within practical shipping distance of the shop and schedule a certain number of calls on them each week—we'd not only schedule these calls but we'd make them, come hell or high water.

We might also want to make up our back dues in the luncheon club and start going again—drop in on the chamber of commerce—maybe to church. In other words, get back into circulation again.

O course we'd still have to make a casting or two. Well anyway, if LEE CAST PRODUCTS should hire a sales promotional manager, I feel pretty sure he'd tackle the job of drumming up business in some such manner. The more I think about this imaginary project the more practical it seems—I know that it is sound from a specialty selling standpoint. I see no reason why even the smallest foundry can't do some of it.

In spite of my lack of experience in the foundry business, there's one thing I'm pretty sure of—there will be quite a few tombstones marking the graves of foundries, both large and small, who try to operate in the days to come on the basis of hand-outs, or acts of God.

OBITUARY

ARTHUR T. WATERFALL, 79, former president, Dodge Bros. Inc., Detroit, and widely known in the foundry industry, died in Detroit, Jan. 29. Mr. Waterfall was identified with Russell Wheel & Foundry Co., Detroit, for 25 years, and served eight years as general superintendent. Later he became traffic commissioner for the Detroit Board of Commerce and traffic manager for Dodge, rising to the presidency of the motor company in 1928 before it was absorbed by Chrysler Corp. He retired shortly afterward and had spent much of his time in California. Mr. Waterfall was president of the American Foundrymen's Society in 1909-10.

* * *

Edward E. Klooz, 80, for 20 years head of the Portage Silica Co., Youngstown, O., died there Jan. 22. Mr. Klooz was born in Cleveland, and following graduation from Case Institute of Technology in 1891, engaged in commercial consulting practice. In 1897 he joined Grasselli Chemical Co., Cleveland, and was in charge of production chemistry at its Cleveland and Tremley, N. J., plants. He became associated with the cement plant of Brier Hill Iron & Coal Co., Youngstown, O., the following year, and in 1909 was made manager of the Portage Silica Co., Youngstown, which operated a plant producing steel molding, sand blast, construction and filtration sands. He was identified continuously with that organization until 1929, when it was absorbed in a merger with a number of other plants to form the Industrial Silica Corp. He became president of this latter corporation and resigned in 1931.

* * *

George M. Hayes, 46, foundry sales representative and metallurgist, died suddenly Oct. 9, in Tuscaloosa, Ala. Mr. Hayes was associated in various capacities with Alabama foundries for more than 25 years, including the Central Foundry Co., Holt, Ala. During the war he was with Thomas Foundries Inc., Birmingham, as metallurgist. Later he was co-ordinator in the veterans training program at University of Alabama, leaving this post in September, 1948 to join Kerchner, Marshall & Co., Birmingham, as sales representative.

* * *

William S. Bremer Sr., 67, who was president of the W. S. Bremer Co., New Washington, O., died at his home there Dec. 9. Mr. Bremer, a pioneer in the aluminum industry, had been associated with development and production of aluminum products more than 40 years. In his early career he designed and built three independent aluminum rolling mills in United States and one in Canada. In 1933 he founded W. S. Bremer Co. and devoted his later years to development of cast aluminum cookware.

* * *

David A. Nemser, 51, metallurgist and head of the New England technical section of the Development and Research Division, International Nickel Co. Inc., died Jan. 5 at his home in West Hartford, Conn. Prior to joining International Nickel in 1934, Mr. Nemser had been chief metallurgist of the Pratt & Whitney Div., Niles-Bement-Pond Corp. He was a member of the Connecticut Non-Ferrous Foundrymen's Association and the New England Foundrymen's Association.

* * *

David P. Hopkins, 81, until his retirement in 1943, vice president in charge of operations and a director, United States Pipe & Foundry Co., Burlington, N. J., died Jan. 13, following a prolonged illness. Mr. Hopkins' association with that company, and one of its predecessor companies, the Addyston Pipe & Steel Co., extended over a period of 54 years. Until his retirement he was active in the affairs of the American Foundrymen's Society.

* * *

G. T. Lunt, 60, managing director, Bradley & Foster Ltd., Darlaston, England, died Jan. 4. Mr. Lunt was interested in technical and research activities connected with the foundry industry and at one time was associated with Dr. J. E. Hurst in this work. He was a past president of the Birmingham Branch of the Institute of British Foundrymen and was also an active member of the British Cast Iron Research Association.

* * *

Charles Knupfer, formerly associated with the Carborundum Co., died Jan. 11, at Niagara Falls, N. Y. Mr. Knupfer represented the company as continental sales manager in Europe, for many years, and in 1936 was appointed general sales manager. Later he became senior vice president and then for three years was assigned to special sales and activities. He retired 2 years ago.

* * *

Frank A. Regan, 50, associated with the Warren Foundry & Pipe Corp., Phillipsburg, N. J., 30 years, died at his home in that city recently. Mr. Regan had served as the company's traffic manager since 1930.

* * *

Shelden W. Tyler, president and general manager, Hamilton Emery & Corundum Co., Chester, Mass., producers of emery and other abrasive grains, died Jan. 14.

* * *

Hugo Heisler, 57, president of the Richmond Stove & Foundry Co., and vice president of the Supreme Foundry Co., both of Belleville, Ill., died recently.

* * *

James B. Thorpe, 66, executive vice president and director, Climax Molybdenum Co., New York, died Jan. 29.

* * *

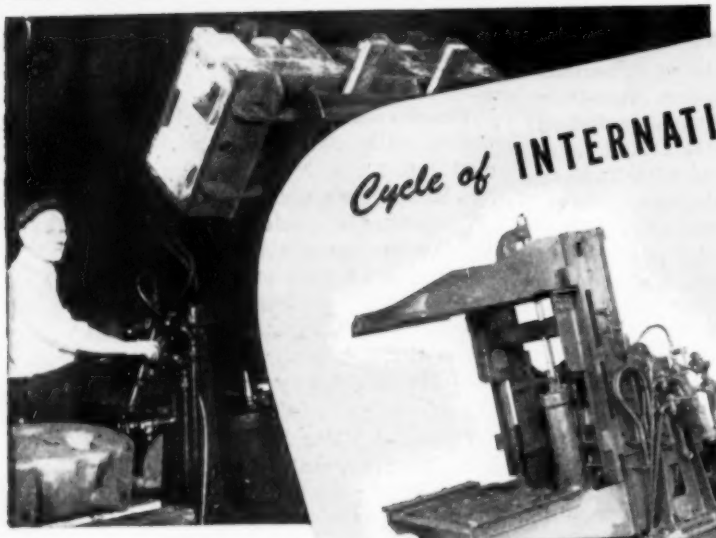
John J. Bechtold, 79, president of the New York Brass Foundry Co., New York, died Jan. 7. Mr. Bechtold organized the company in 1898.

* * *

Roy J. Gardner, 61, night plant superintendent of the General Steel Castings Corp., Granite City, Ill., died Jan. 6. Mr. Gardner had been associated with the company 39 years.

* * *

Harry L. Ferguson, 67, president, Acme Aluminum Foundry Co., Chicago, died Jan. 9 of a heart attack while in Fort Lauderdale, Fla.



Cycle of INTERNATIONAL TYPE AN MACHINE

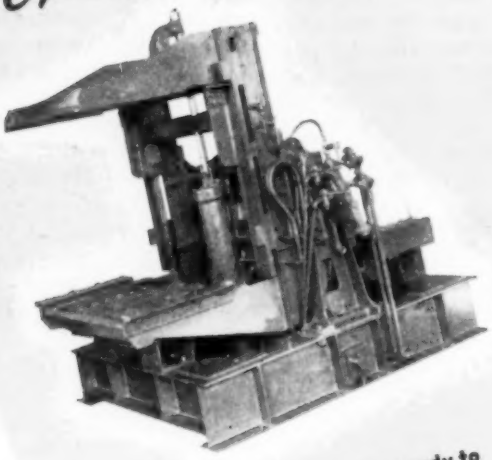


FIGURE 1 shows the machine ready to receive the core box or mold after it has been rammed.

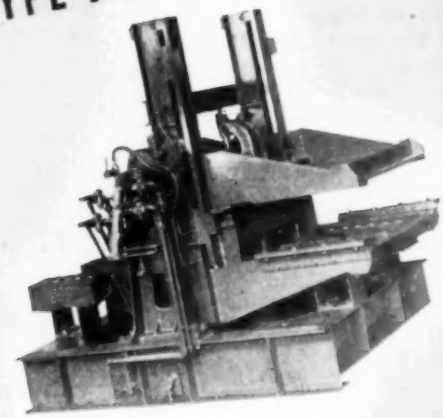


FIGURE 2 shows that the clamp valve has been operated to bring the upper frame down to clamp the core plate to the box or bottom board to flask. The movement of this frame is automatically limited according to the depth of the box or overall of pattern plate flask and bottom board.

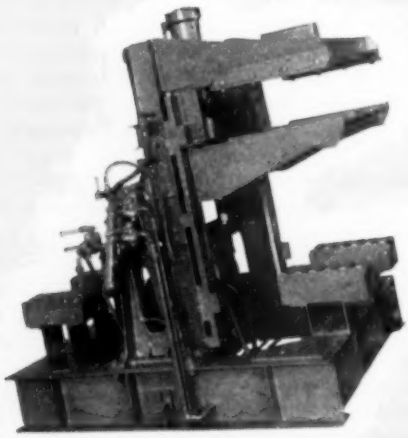


FIGURE 3 shows that the turnover valves of the machine have been operated so that the entire center unit which supports the turnover frame of the machine—carrying the clamped box or complete half mold—is turned over.

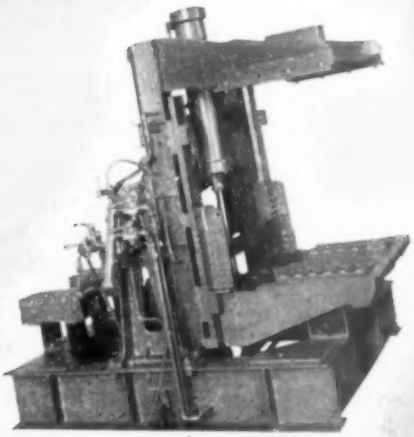
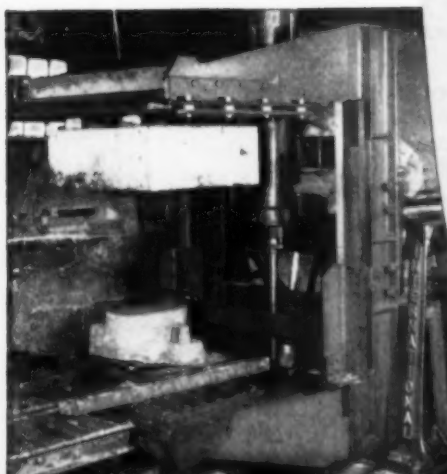


FIGURE 4 shows that the clamp cylinder has been exhausted, releasing the core plate—supporting the core—or bottom board supporting the mold from the turnover frame, thus affecting the draw of the machine. The vibrator operates while the draw action is taking place.



Hard to Draw . . . Short Run . . . Many Different Sizes of Jobs

International Type AN Machine for clamping and turning over core boxes or flasks and for drawing the core or mold. No rigging time is required for this machine. The core box or pattern is fastened to the turnover frame by sliding the cleats that have been fastened to the under side of the box or pattern plate into the grooves with which the turnover frame has been provided. Absolutely no adjustments are required. When boxes or patterns are changed from one size to another, the variations are automatically taken care of, irrespective of how much difference there is in the width, length and depth of the boxes or flasks for which the machine has been recommended.

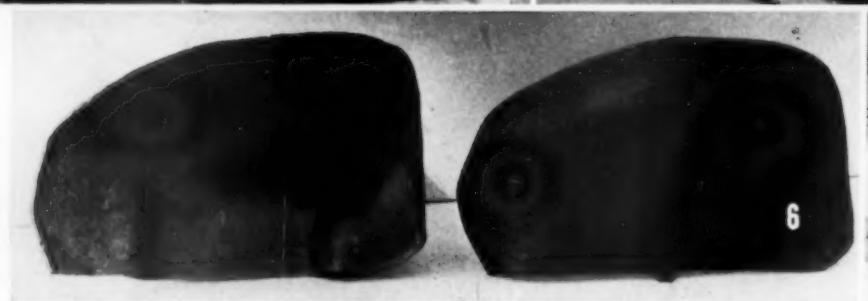
INTERNATIONAL MOLDING MACHINE COMPANY - La Grange Park, Illinois

Thermoplastic

ALTHOUGH phenol - formaldehyde and other thermosetting casting resins have heretofore received the most widespread attention as pattern materials for the foundry, some foundrymen forecast growing pattern applications for the thermoplastic casting resins.

Thermoplastic materials are the plastic analogies of metals in the sense that is implied here. They can be melted and remelted, whereas thermosetting plastics are comparable to concrete and plaster — being extremely difficult to reclaim once they are cast and set.

Generally speaking, thermoplastics are less heat-resistant than their thermosetting relations; they will soften at 300° F in the case of certain types, and at 120° F in the low-melt grades. Cast thermosets tend to crack at about 350° F. Offsetting the disadvantage of low heat resistance is the fact that thermoplastics, as a group, have an exceptional va-



Patterns

By THOMAS A. DICKINSON
Los Angeles

riety of desirable physical properties and can be used *repeatedly* — not only to duplicate various articles by casting, but in modeling original patterns.

Typical of thermoplastics that can be used in modeling or duplicating patterns is Plasticarve, a low-melt compound produced by Plasticarve Corp., Pasadena, Calif. At temperatures of less than 115° F, it is a stable opaque-white material with a nonporous sheen and better strength than most unfilled plasters. When it has been softened by heating in hot water at about 120° to 125° F, it becomes extremely soft and pliable like modeling clay or putty and can be readily hand-worked to produce various shapes; or, if it is heated to 150° F, it becomes a low-viscosity fluid which can be cast as easily as wax but without the latter's shrinkage characteristics.

Because it resists shrinkage during solidification, plus the fact that the new thermoplastic has a flash point of more than 500° F, it has been used with particular success as a reclaimable pattern material for the fabrication of plaster molds in investment casting. According to officials of Intracast Co., Fullerton, Calif., where this application was initially developed, such thermoplastic patterns have the following advantages:

1. They can be rapidly duplicated in low-melt alloy molds without a noticeable loss of dimensional accuracy or defects such as flow lines due to fast chilling.

2. They do not readily burn and can be quickly reclaimed for use in making additional patterns after they have been melted from the cavities of vacuum-formed plaster molds.

As an original-pattern material, Plasticarve is advantageous because it can be heat-softened and hand-shaped, or melted and cast, to produce a rough pattern on which final details can be cut or carved with clay - sculptoring or woodworking tools at room temperature.

When it is desirable to model the parts of a pattern separately, the requisite parts can be rough-cast or hand-shaped and detailed in the aforementioned manner; then a complete assembly can be produced by fusing the parts together with a soldering iron.

The patterns thus made are not subject to breakage if handled with reasonable care, and can be stored for long periods of time at room temperature without warpage, shrinkage, cracks, sags or related types of aging defects. If there is danger of damage due to careless or excessive handling, or due to overheating, certain preventive steps can be taken:

a. The pattern can be protected by coating with heat-resistant enamels or by metallizing its surfaces.

b. The pattern may be used only to fabricate molds for duplicate patterns. A low melting point alloy can be sprayed on Plasticarve surfaces to produce accurate metal molds without damaging the pattern; or, if this is impractical, the thermoplastic pattern can be used to fabricate sand molds without damage.

Thermoplastic patterns are exceptionally useful when a small number of metal articles must be reproduced by sand casting, because they can be made in a comparatively short period of time without difficulty and because they can be used without special surface coatings or treat-

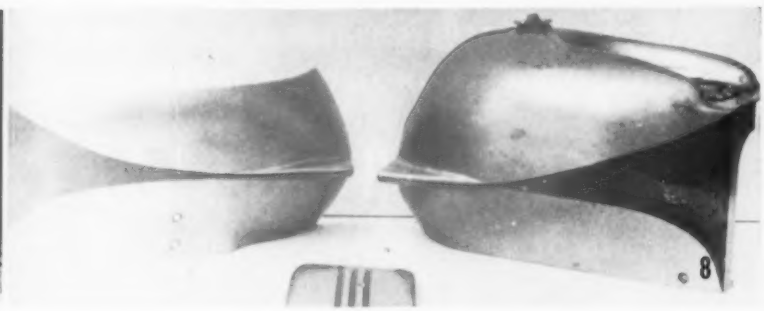


Fig. 1—Casting a molten thermoplastic in a small two-piece plaster mold
Fig. 2—After it has been heat-softened in hot water, a low-melt thermoplastic can be hand formed much like modeling clay or putty
Fig. 3—A soldering iron is used to fuse two separately made parts of a thermoplastic pattern
Fig. 4—As indicated here, most of the castable thermoplastics can be worked with carpenter's tools
Fig. 5—A marble slab and four metal bars are used as a mold for casting a thermoplastic sheet
Fig. 6—Sand mold patterns made from the plaster mockups shown in Fig. 7
Fig. 7. These mockups were used in hand-forming inexpensive thermoplastic patterns for casting experimental outboard motor shrouds. The sand cast shrouds are shown in Fig. 8

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METAL MELTING **FURNACES**

FOR

BRASS—ALUMINUM—MAGNESIUM

AND ALL OTHER NON-FERROUS METALS AND ALLOYS

GAS OR OIL FUELS

TILTING AND NON-TILTING TYPES

SINGLE AND MULTIPLE BURNERS

AUTOMATIC PROPORTIONING SINGLE VALVE CONTROL ASSURES UNIFORM RESULTS WITH MAXIMUM ECONOMY OF OPERATION.

The Campbell-Hausfeld Co.

300-320 MOORE ST. HARRISON, OHIO

ments the same as conventional type patterns. For example, Century Engineering Co., Los Angeles, recently effected a substantial saving by using such patterns to sand cast the shrouds for an experimental outboard motor. The procedure was as follows:

1. The thermoplastic was melted and cast to produce flat sheets of the required thickness.
2. The sheets were softened with hot water, so that they could be hand-pressed to the contours of plaster mockups for the subject shrouds.
3. The sheets were appropriately trimmed around the edges and lifted from their mockups when they were adequately cool and rigid.
4. The mockup-contoured sheets were used like finished wood patterns to make sand molds, in which shrouds were subsequently cast with aluminum alloys.

Among thermoplastic pattern materials in the higher temperature range, ethyl cellulose compounds such as Thermocast and Plastalloy appear to have the most desirable properties for casting and for maximum strength properties thereafter (a fact which may be illustrated by the successful use of ethyl cellulose casting resins in the fabrication of drophammer dies for aircraft work during World War II).

Pure ethyl cellulose may be compounded with dozens of different materials—including castor oil, clay, wax and various coal tar products—for casting purposes. Therefore, the physical properties of such resins are subject to numerous variations—ranging from glass-clear transparency to coal-black opacity, semi-flexibility to ceramic brittleness. However, the following features can be considered as more or less typical:

Softening point	300° F
Melting point	420° F
Specific gravity	1.10
Refractive index	1.470
Tensile strength	10,000 psi
Compressive strength	20,000 psi
Izod impact strength	10
Brinnell hardness (10 kg.)	8
Chemical resistance (to acids, etc.)	Fair
Machining qualities	Like hard wood
Mold shrinkage	0.010 in./in.

While ethyl cellulose materials cannot be heat softened or hand worked like low-melt thermoplastics, it is possible to fabricate ethyl cellulose patterns with woodworking equipment—and such patterns may be considered economically desirable whenever a combination of high mechanical strength and thermoplastic reclaimability is necessary. However,

(*Concluded on page* 164)

CITIES SERVICE

Delco 30 Series

the Big News in Core Oil!

After several years of research and field performance tests, Cities Service Delco 30 Series Core Oils were made available to the foundry industry last year. From leading foundries using these products come enthusiastic reports showing that performance more than meets our most optimistic expectations.

Principal advantages as reported are:

BETTER PERFORMANCE in core boxes, whether blown or hand rammed, whether sand is washed and dried or crude.

FASTER DRYING TIME without recourse to older types of drying oils.

WIDE RANGE OF WORKING TEMPERATURE—ready for use without pre-conditioning, whether in Texas or Montreal.

BAKES OUT AT LOWER TEMPERATURE, saving time, oven capacity and fuel.

HAS A CLEAN, PLEASANT ODOR.

MADE IN FIVE QUALITY RANGES accommodating all local foundry and core room conditions.

Cities Service sales engineers are ready to supply full information and assistance in choosing and applying the correct grade for your specific requirements. Contact your local Cities Service representative for information and immediate service assistance. Cities Service Oil Company, Chicago, Cleveland, Kansas City, St. Paul and Toronto, and Arkansas Fuel Oil Company, Shreveport.

DELCO CORE OILS
ROSINAL LIQUID CORE BINDER
DELCO CORE AND MOLD WASH

CITIES SERVICE

AN EASIER WAY IN A BRASS FOUNDRY

"Table-top" brass melting with Crucible furnaces demonstrates economies in this foundry of Crouse Hinds Co. of Canada, Ltd.

UP WHERE it is accessible for adjustments or any repairs, is the obvious advantage of this table-top brass-melting Crucible furnace designed by plant engineer Thomas Henry of Crouse Hinds Co. of Canada, Ltd.

Use of covered charging hopper reduces waste of metal by oxidation and saves fuel. Some difficulties of making repairs or adjustments are minimized by lug bolts which permit dropping the furnace bottom quickly.

This all adds its bit to the evidence that melting non-ferrous metals with Crucibles is the most simple, satisfactory and economical modern method.

There are many practical and useful suggestions in "Crucible Melters' Handbook;" mailed free. Write for the Handbook today.

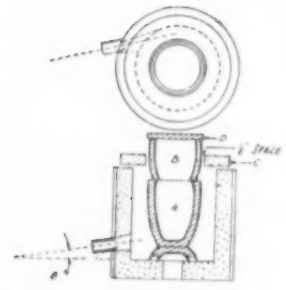

Diagram of Crucible furnace with special furnace cover and charging hopper for heat economy and speed of melting.

(*Concluded from page* 162)

it seems most likely that these thermoplastics will find a majority of foundry applications in the manufacture of duplicate patterns, match plates, coreboxes, etc.—especially so in view of the fact that they can be cast with considerable precision.

Ethyl cellulose resins are usually cast in molds made from metals and plaster of paris. Plaster molds are prepared for use by careful drying, sealing the cavity pores with bake-on varnish, and coating the varnish-sealed cavity surfaces with a silicone lubricant. Metal mold cavities, if properly made from suitable heat-resistant metals, require only the silicone parting agent.

Either type of mold should be preheated to at least 200° F to prevent chill lines and to maintain the molten fluidity of an ethyl cellulose casting resin until air bubbles (due to mixing and casting) have had a chance to escape. When difficult shapes must be cast, or if optimum physical properties must be attained, a mold may be preheated to about 350° F, and the cooling action of ethyl cellulose casts may be delayed so that several hours will pass before final solidification takes place.

No additives are required in remelting thermoplastic materials which are not contaminated with dirt.

Offers Reprint on Aluminum Articles

"Aluminum Alloy Castings," a 64-page booklet, is a composite reprint of 12 articles originally published in THE FOUNDRY and two articles published in *Steel*, written by Floyd A. Lewis. The articles were based upon a postwar survey sponsored by the foundry division of the Aluminum Association and reflect the many wartime advances in the aluminum casting art. Copies of the booklet may be obtained from the Aluminum Association, 420 Lexington Ave., New York 17, for 50 cents each.

Book Review

Source Book of Personnel Forms, by Lawrence Stessin and the staff of National Foremen's Institute Inc., leather, 176 pages, 8½ x 11 in., multi-ring loose-leaf binder, published by National Foremen's Institute Inc., Deep River, Conn. Price $7.50.

Convenient check list against which company forms of all types of companies may be compared and, where necessary, brought up to date contains a description of 170 forms which are illustrated and analyzed. The forms are arranged under 33 topics.

Through the Winter Months "GREAT LAKES" DRIED SANDS

✓ FOR EASY HANDLING
✓ MAXIMUM SAND CONTROL

AVAILABLE FOR PROMPT SHIPMENT

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LAKE SHARP SANDS
A.F.A. fineness #42, #48 & #60
Artificially Dried & Screened

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JUNIATA BANK SANDS
A.F.A. fineness #90 & #100
Artificially Dried & Screened

•

SILICA SANDS
from
Illinois, Wisconsin, Michigan, Ohio and New Jersey
Washed, Dried & Screened

ORDER NOW!

Why experience the annoyance, higher handling and freight costs, which result from sands loaded with frost and often ice? With such sands foundry costs are higher, cores and molds usually not up to your standards!

Look to Great Lakes for thoroughly dried (moisture free) accurately graded sands. Many foundries use Great Lakes dried sands the year around.

A Great Lakes man who knows foundry sand problems will be glad to consult with you. Your inquiry will receive immediate attention.

Great Lakes Foundry Sand Co.

UNITED ARTISTS BUILDING
DETROIT 26, MICHIGAN

MEMBER OF

American Foundrymen's Association
American Ceramic Society
Foundry Equipment Manufacturers Assoc., Inc.
National Industrial Sand Association
National Association of Manufacturers
Indiana State Chamber of Commerce

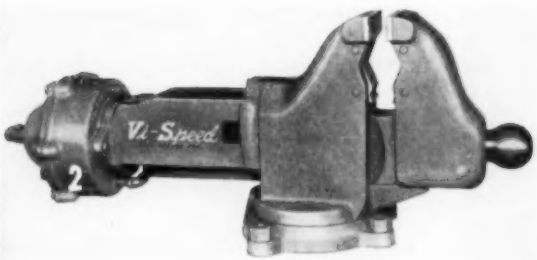
MINERS—PROCESSORS—FOUNDRY, METALLURGICAL AND SAND BLAST SERVICE

NEW Equipment AND Supplies

(1)—Core Blower: Harrison Machine Co., 2725 Station Rd., Wesleyville, Pa.—Newly developed core blowing machine has a valve of hardened stainless steel, operating on a Neoprene seat. The valve lifter is actuated by the sealing pressure on a sealing diaphragm through which the blast of air passes in a series of diverging orifices, keeping the valve chamber clean and free of sand, it is claimed. Unit has a double air chamber which holds a constant pressure on the sealing and clamping parts, regardless of any drop in pressure from blowing action. Wide-spaced bearings are sealed for long life. Machine is designed to blow 2-in. cores and has a table measuring 10 x 16 in., with a space between table and nozzle of 9½ in.

(2)—Air Vise: Van Products Co., 1302 Erie Trust Bldg., Erie, Pa. —Air-operated vise has a jaw pressure of 50 times selected air pressure. Jaws are patterned after those on a standard machinist's vise and have nonremovable faces of hardened steel. Jaws will operate on air line pressures of 15 to 150 psi and will exert pressures of 0 to 3½ tons. Stroke of the jaws is adjustable between 1/64 in. and 1¼ in. and jaw openings vary with the different models from 6 to 11 in. Vise may be mounted horizontally or vertically and in addition to being a holding tool may be used to crimp, bend, drive, bead, form, rivet, etc. Air supply is controlled by a foot valve, leaving the hands free to perform work on the piece being held.

1



(3)—Molding Machine: Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35—A new 21-in. jar ram, power rollover, power draw machine has been developed by the company. Former models in this size were at least partially hand operated. Its specifications are: Pattern draw, 8 in.; table 21 x 28 in.; capacity at 80 lb air pressure, 450 lb; rollover cylinder, 5½ in.; draw cylinder, 4½ in.; jar cylinder, 5 in. and space available for pattern board, flask and bottom board, 13 in. It is available with hand or air clamp. Company engineers also have designed a new counter-balancing mechanism, said to be quickly and accurately adjusted, for use on jar ram, hand rollover, hand draw machines made by the company.

(4)—Magnetic Truck Drive: Clark Equipment Co., Industrial Truck Division, 258 Champion St., Battle Creek, Mich.—Newly designed driving mechanism for gasoline-powered lift trucks transmits power from the engine to the wheels by magnetic induction. The unit employs two magnetic coils mounted within the flywheel and surrounded by magnetic poles. They rotate with the flywheel and are the driving members—one coil for "forward" and the other for "reverse." Two rotors attached to a special forward-and-reverse constant-mesh gearing, are the driven members. The magnetic inductive force is applied through an air gap and as a result there is no metal-to-metal contact between driving and driven members. The conventional clutch

(*Continued on page* 170)

Redford CORE BLOWER CARTRIDGE TYPE

A few of the thousands of cores that are made daily on Redford Core Blowers.

• PROVEN •

Hundreds of foundries are using Redfords as an efficient low cost means of producing small cores. The high percentage of reorders we receive proves that Redfords are profitable to own.

• SIMPLICITY •

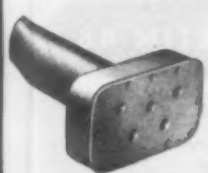
The Redford reduces core blowing to its simplest form. Anyone can understand—operate and maintain it.

• SPEED •

All the work of handling core box and driers is done on the machine. Cartridges can be quickly loaded by hand. As many as 200 boxes are being blown and drawn by one operator in one hour.

• FLEXIBILITY •

With a Redford you can make any number of different cores without loss of time for change-overs. Here is what a large jobbing foundry has to say: "We are using 7 Redfords. Your development of the portable cartridge which can be made a part of the core box equipment, has given us all the advantages of core blowing without loss of flexibility so essential to us."



Sand Cartridges Available In 12 Standard Sizes

Blower comes complete, ready to use. Each blower provided with one Size "C" sand cartridge which is adaptable to a large range of core boxes. Cartridges are available in eleven additional standard sizes and special sizes furnished where needed.

WE HAVE THE "KNOW HOW" AND WILL ASSIST YOU IN SOLVING YOUR CORE BLOWING PROBLEMS

Redford IRON & EQUIPMENT CO.

PHONE: REDFORD 8611

20733 GLENDALE AVENUE • DETROIT 23, MICHIGAN

COLEMAN Ovens...

FOR GREATEST PRODUCTION AT LOWEST POSSIBLE COST

"more efficient... more dependable... more economical", is what enthusiastic owners everywhere say about their Coleman Ovens!

"Our Coleman Tower Oven has been in operation continuously twenty to twenty-four hours per day, seven days per week . . . which certainly proves its dependability under uninterrupted operation . . . our spoilage is less and our entire operation is more economical."

— **H. S. GULICK,** ***The New York Air Brake Co.***

"We are enthusiastically complimenting you on the quality of our Coleman Oven installation and its operation . . . the ovens have been entirely satisfactory and the efficiency which they have attained has been beyond our expectations."

— **S. V. WOOD,** ***Minneapolis Electric Steel Castings Co.***

"Our Coleman Ovens have seen a lot of heavy service and are doing a remarkably fine job in every way . . . the savings from our shortened drying cycles, absolute uniformity in mold drying, and elimination of mold and casting scrappage have long since returned our investment in Coleman Ovens."

— **J. D. JAMES,** ***The Cooper-Bessemer Corp.***

"Our Coleman Tower Core Oven has 'outperformed' your specifications and is giving entire satisfaction."

— **A. E. SCHOBECK,** ***Jamestown Malleable Iron Corporation***

● When you want to get the real facts about equipment you plan to buy...ask a user! Owners of Coleman Ovens are glad to recommend this equipment because of these outstanding advantages:

PERFECT BAKING AND DRYING. Coleman Ovens eliminate all uncertainties in core baking and mold drying. Rejects and make-overs are eliminated.

INCREASED LABOR SAVING. Efficient and modern mechanical design reduces handling and other indirect labor to a minimum.

DEPENDABLE PERFORMANCE. Heavy duty construction assures steady day in and day out operation with a minimum of down time, and lowest upkeep expense.

MAXIMUM FUEL ECONOMY. Coleman Heating Systems are noted for their low fuel consumption. For operation with the lowest cost fuel in your locality—gas, oil, stoker-coal, electricity, etc. Combination systems available.

BETTER WORK CONDITIONS. Positive ventilation built into Coleman Ovens prevents leakage of fumes and gases and helps to make the core department a good place to work.

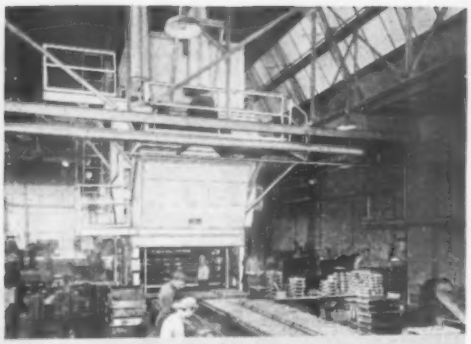
WRITE TODAY FOR BULLETIN 48

COLEMAN OVENS ARE AVAILABLE IN A WIDE RANGE OF SIZES AND CAPACITIES FOR VARIOUS PRODUCTION NEEDS, ASSURING DEPENDABLE PERFORMANCE AT LOWEST POSSIBLE COST

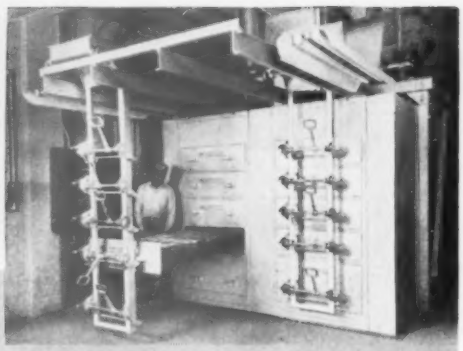
The FOUNDRY EQUIPMENT C

CLEVELAND 13, OHIO, U. S. A.

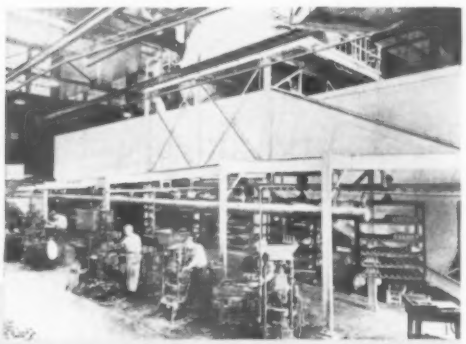
WORLD'S OLDEST AND LARGEST FOUNDRY OVEN SPECIALISTS



COLEMAN TOWER OVENS
For high speed production at lowest cost. Patented Open Center permits loading from inside and out, providing maximum labor saving.

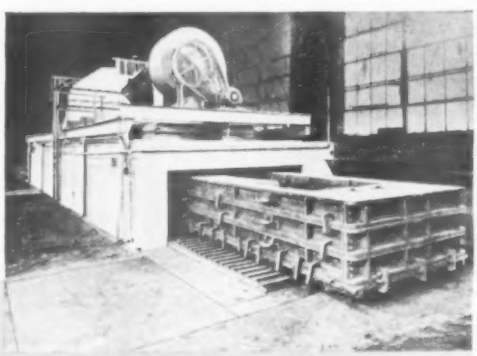


COLEMAN ROLLING DRAWER OVENS
For small and medium cores. High-speed production with limited floor space.

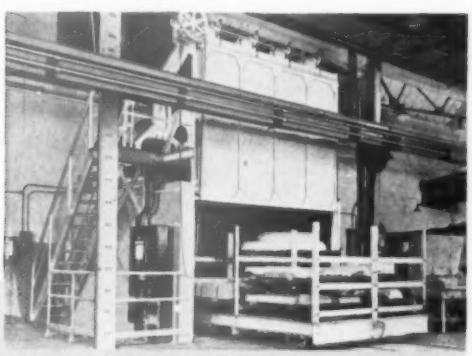


COLEMAN HORIZONTAL CORE OVENS
Overhead conveyor ovens specially designed for large scale production foundries in such fields as agricultural, automotive, etc.

COLEMAN TRANSRACK OVENS
For use with portable racks to reduce handling labor. Very efficient where ample floor space is available.



COLEMAN CONTINUOUS MOLD OVENS
For high speed continuous drying of molds. These ovens provide amazing drying speed at a fraction of the cost of former methods.



COLEMAN CAR-TYPE OVENS
For baking large cores or drying molds. Coleman Car-Type Ovens are used by most of the leading producers of heavy castings.

COLEMAN PORTABLE CORE OVENS AND COLEMAN PORTABLE MOLD DRYERS ARE OTHER MEMBERS OF THE COLEMAN FAMILY OF COMPLETE CORE BAKING AND MOLD DRYING EQUIPMENT

COMPANY
BUILDERS OF COLEMAN AND SWARTWOUT OVENS

MEMBER
MANUFACTURERS ASSOCIATION, INC. FOUNDRY EQUIPMENT

COLEMAN
CORE AND MOLD OVENS

OVER 9000 SUCCESSFUL INSTALLATIONS

He didn't forget . . .

He just took a chance!

When workers risk their eyes, with disastrous results to both themselves and the company alike, it's time to look into the cause of unsafe practices.

Goggle Style TAW51

WILLSON answers the problem of getting safety equipment worn by designing the utmost comfort into their entire line of eye and respiratory protective devices. The goggles illustrated have eyecups that are molded to fit the bony structure around the eyes. The chain bridge and elastic headband are adjustable for comfortable fit. And the Super-Tough* lenses meet or exceed Federal Specifications for optical clarity as well as impact resistance.

DAILY REMINDERS

Such as Willson "Blind Man" Safety Posters keep workers aware of the need for wearing goggles. Supplies available on request.

WILLSON®

"Established 1870"

*T. M. Reg. U. S. Pat. Office

WILLSON PRODUCTS, INC., 237 WASHINGTON STREET, READING, PENNA.

(Continued from page 166)

and transmission have been eliminated. Exceptional smoothness of operation with elimination of jerking starts and stops, reduction of wear and tear on the machine and less driver fatigue are features claimed for the new development. Electrical requirements are furnished by a standard 6-volt generator.

Disk Sander: Freeman Supply Co., 1152 East Broadway, Toledo 5, O.—New 20-in. diam disk sander and grinder is designed especially for pattern shop use. Machine is direct motor driven by 2-hp motor. Large size 14 x 27½-in. ground cast iron table has ends that extend back of disk face, tilts 45 degrees and adjusts vertically to within 2¾-in. of bottom of disk. Table movements are made with hand wheel worm and worm gear. Blower system is available or brackets can be furnished for attaching to regular exhaust system.

Portable Hardness Tester: Riehle Testing Machines Divison of American Machine & Metals Inc., East Moline, Ill.—Portable hardness tester for Rockwell readings, A, B and C scales, weighs 3 lb, 6 oz, and has a range of 5 in. in diam or thickness. It is furnished in a carrying case with three test blocks, flat anvil, V anvil, convex anvil and diamond and ball indentors. It is said to have accuracy comparable to bench type testers.

FOR EVIDENCE of CARL-MAYER OVEN SATISFACTION

Read our Mail

Letters like this, and we have many of them, prove that Carl-Mayer oven design contributes greatly to improved core room results. Carl-Mayer Patented *(Pat. No. 2,257,180)* Recirculating Heating System, obtainable only on Carl-Mayer Ovens, assures unusually fast and uniform baking with amazing fuel economy. Carl-Mayer design also keeps working conditions *comfortable* because heat and fumes are removed from the cores before they reach the unloading zone.

High grade construction keeps maintenance low.

WRITE FOR BULLETIN showing the extensive line of Carl-Mayer Core and Mold Ovens.

Union Brass & Metal Manufacturing Company

INCORPORATED 1902

PLUMBERS BRASS GOODS

Telephone Humboldt 1331 *501 West Lawson Avenue* *Saint Paul 3, Minnesota*

April 9, 1947

Mr. C. F. Mayer, President
The Carl Mayer Corp.
3030 Euclid Avenue
Cleveland 15, Ohio

Dear Mr. Mayer:

We are very much pleased to enclose two copies of a photograph showing your core oven and our core room layout. The gentlemen in the picture reading from left to right are our Sales Manager and Secretary, Mr. George F. Gerlach, and our President and General Manager, Mr. Henry J. Michel.

Since this picture was taken, we have added two core blowing machines. They are approximately directly under the receiving tanks which are shown in the picture.

As you probably know, our new core room was laid out on paper and a building constructed to house this new equipment. We are very proud of our new core room and would be more than glad to show it to you or to any one interested.

The oven is operating beautifully, and we are very much pleased with the results so far.

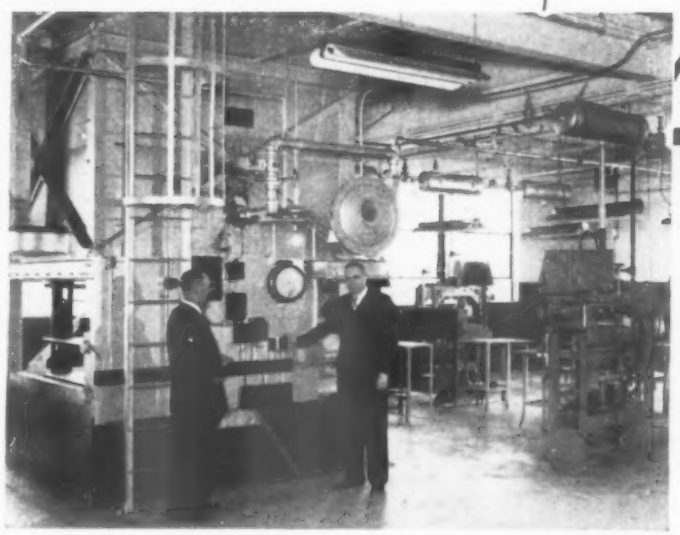
Yours very truly,

UNION BRASS & METAL MFG. CO.

C. J. Becker
Vice Pres. & Treasurer

CJB:jh

Encl. 2



CARL-MAYER VERTICAL CORE OVEN
At Union Brass & Metal Mfg. Co., St. Paul, Minn.

Typical Carl-Mayer Customers!
MANY REPEAT INSTALLATIONS

Aluminum Co. of America
American Brake Shoe Co.
American Radiator Co.
Brown Industries
Bucyrus-Erie Co.
Cadillac Motor Co.
Crucible Steel Castings Co.
Dunkirk Radiator Co.
Eclipse Aviation Division of Bendix Aviation Corp.
Electric Autolite Co.
Ford Motor Co.
Fremont Foundry Co.
General Electric Co.
General Motors Corp. and Subsidiaries
Gilbert & Barker Co.
General Steel Castings Co.
Golden Foundry Co. Inc.
Harrison Radiator Corp.
Henry Kaiser Corp.
Jarecki Mfg. Co.
W. O. Larson Foundry Co.
F. E. Meyers & Bro. Co.
Oil Well Supply Co.
Packard Motor Co.
H. B. Salter Co.
Shenango Penn Mold Co.
Studebaker Corp.
Union Brass & Metal Mfg. Co.
A. C. Williams Co.
Whiten Machine Works
Whiting Corp.

ROLLING DRAWER OVEN

PORTABLE RACK OVEN

VERTICAL OVEN

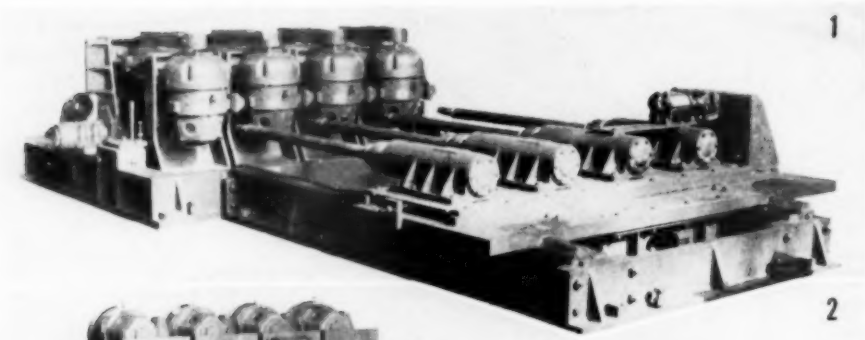
CAR TYPE OVEN

HORIZONTAL MONORAIL CONVEYOR OVEN

The **CARL-MAYER** *Corp.*
3030 EUCLID AVE. CLEVELAND, OHIO
CORE AND MOLD OVENS

Centrifugal Casting Machine

Produces Soil Pipe at High Rate



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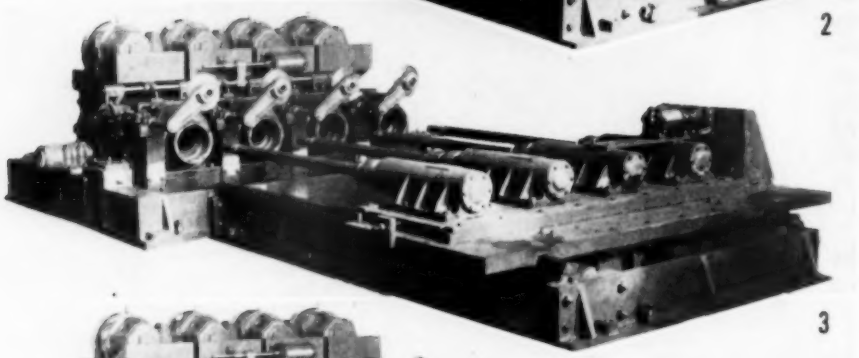

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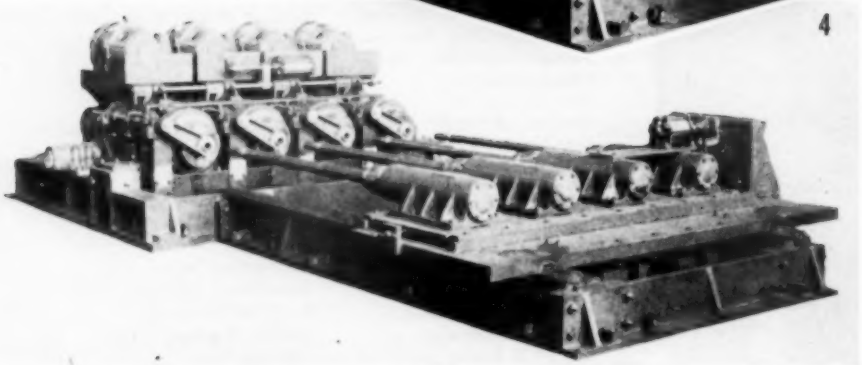

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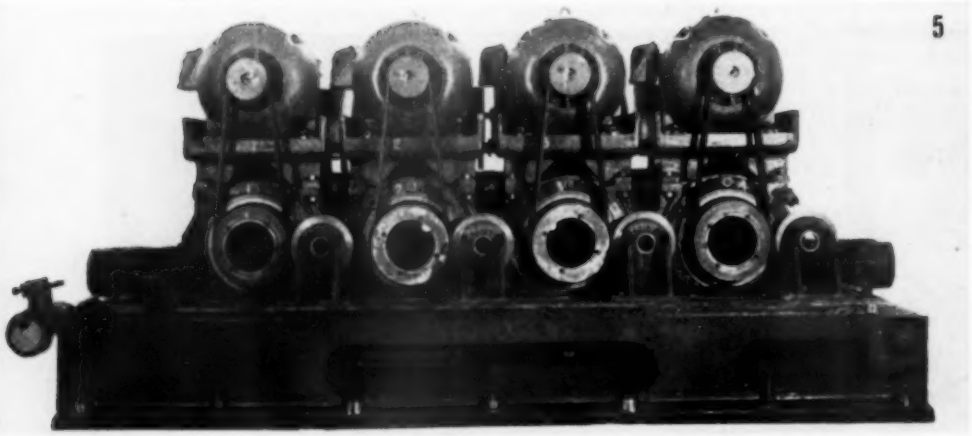


5

COMBINING the dual function of mold making and centrifugal casting, a new type machine developed by the Herman Pneumatic Machine Co., Pittsburgh, for the production of cast iron soil pipe is capable of an unusually high operating rate. The unit is known as the Rol-O-Cast machine, and its design can be modified to produce, in addition to soil pipe, such items as liners, bushings, ring pots, cast tubing and other products of similar shape.

The first machine built for commercial operation is scheduled to be installed this spring in the foundry of a southern soil pipe producer under a license agreement. Anticipated output of pipe with the machine at this plant is placed at 120 to 136 lengths of 5-ft pipe per hour. On the basis of the lower figure and five-man operation, this would result in production of 192 pieces per man per 8-hour shift. Expectations of this volume production are supported by trial operation of the machine for a number of weeks recently at a Pittsburgh district foundry.

Produces Four Lengths Simultaneously

Accompanying illustrations show the machine on the assembly floor but they will suffice to explain general features of design and operation. The equipment consists of four flasks centrally controlled for simultaneous horizontal spinning by four variable speed electric motors. These flasks are gray iron cylinders which can be swung 90 degrees to a vertical position for introduction of sand and subsequent ejection of the castings. Fig. 1 shows the flasks in this position ready to be filled with sand from hoppers (not shown here) above the machine. The flasks then are lowered to a horizontal position (Fig. 2) and spun at about 1000 rpm. This spinning action distributes the sand evenly throughout the flasks and partially forms the mold.

The next step is simultaneous insertion into the center of the molds of four mandrels which are free to revolve but are not power driven. With the flask rotation reduced to 400 rpm the mandrels are moved sideways ⅝-in. (Fig. 3) to further compress the sand and form the required inside mold diameter that will produce 4-in. inside diameter pipe. In addition, the mandrels also form the core print for the pipe hub. After the mandrels have been returned to the center position they are withdrawn, and dry sand cores to form the inside of the hubs are placed on core setters and mechanically in-

(*Continued on page* 176)

"One veteran worker can distribute approximately 20 tons of sand a day"

. . . states the Buffalo plant manager, Allegheny-Ludlum Steel Corporation

The BELL Prime Mover*

● In foundries, as well as in other plants, Bell Prime Movers give older workers a new lease on their jobs. They save money, too. At Allegheny-Ludlum, the Prime Mover saves up to $200 a month in direct labor . . . hauling sand in its big bucket.

Not only can Prime Movers earn back their first cost on "wheelbarrow" jobs, but they have other uses . . .

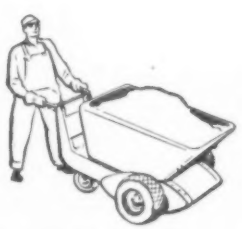
It takes only a moment to lift off the giant bucket and drop a steel platform body into place . . . either 9- or 14-square-feet . . . converting the Prime Mover to a half-ton truck of great mobility and usefulness.

Still greater versatility results when a 50-inch steel blade is bolted to the chassis . . . useful for plowing snow, pushing sand, or light grading.

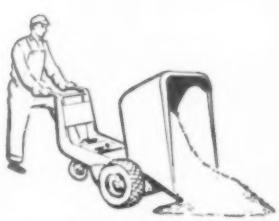
Prime Movers are valuable for two-level foundry layouts with ramps or elevators. For example, at the Bronx Brass Foundry, Inc., the Prime Mover transfers sand from the basement to the first floor. Here the ramp-grade is between 26 and 30 per cent. In two trips with the Prime Mover, one man does as much as two men could do in four trips with ordinary wheelbarrows.

Impressive as these two examples may be, it still takes an on-the-job demonstration to illustrate the Prime Mover's remarkable adaptability to foundry duties. If you would like to see such a demonstration, we'll gladly arrange one. For information, please sign this coupon and mail it to us.

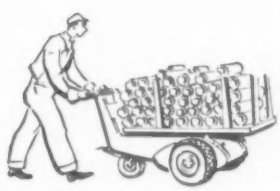
FEATURES:



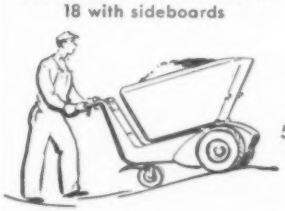
Bucket holds 10 cubic feet . . . 18 with sideboards



Mechanically dumped . . . operates by foot pedal

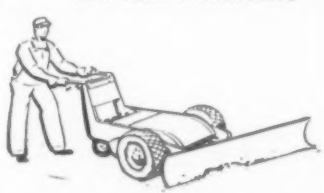


9- or 14-square-foot steel platform takes half-ton loads



Climbs 20% grades fully loaded

50-inch steel blade makes Prime Mover an efficient snow plow



- Gear driven . . . no belts or chains.
- Fully enclosed engine protected against dirt and moisture.
- Clutch, engine, transmission all run in oil.
- Switch from bucket to platform without tools . . . in less than a minute.
- Turns in its own length (63½"); width 31½".
- 3-gallon tankful of fuel gives 8 hours continuous service.

A PRODUCT OF **BELL** *Aircraft* CORPORATION

*PATENTS & T. M. REG. PENDING. COPYRIGHT, 1949

MAIL COUPON TODAY

Bell Aircraft Corporation
P. O. Box 1D3, Buffalo 5, N. Y.

Please send me facts on the Bell Prime Mover. Who is the nearest distributor?

Name.....

Company.....

Address.....

City, Zone & State.....

LINK-BELT FOUNDRY

PHILADELPHIA

Two Model 70 Speedmullors—and two Sandslingers, a Stationary Type and a Motive Jr. Type—*all* were part of a reorganization program to mechanize Olney Foundry of Link-Belt Company.

Both Speedmullors are automatically controlled for time cycles of 1¼ to 1½ minutes per batch—including loading, additions, mulling, cooling and discharging. They *thoroughly* mull and cool over 700 tons of sand per day, and "thoroughly" is the word for it because Olney is exacting in its sand specifications.

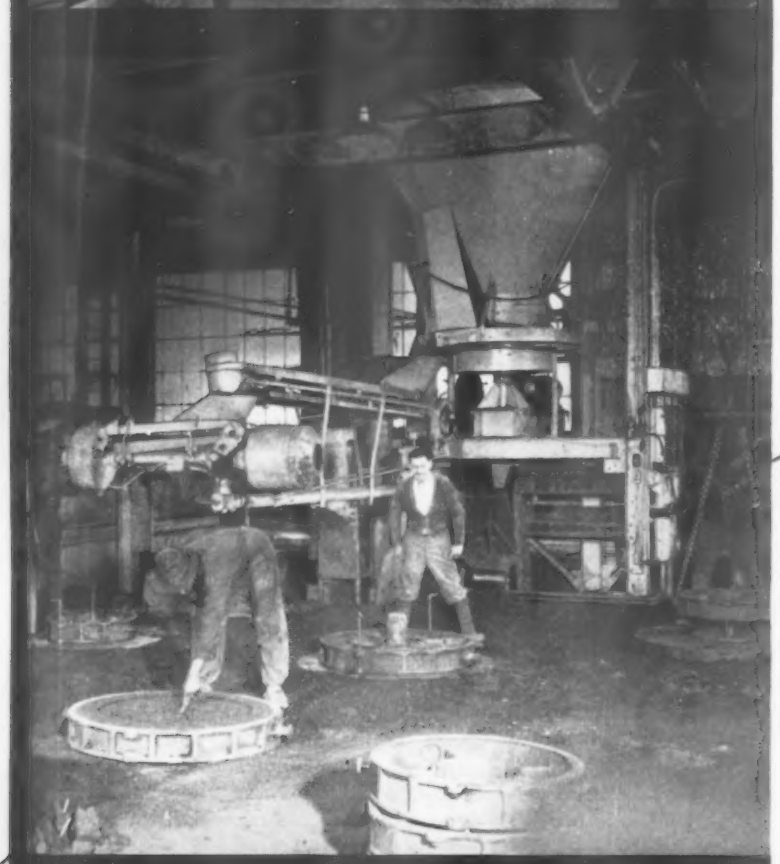
Olney's Stationary Type Sandslinger rapidly and uniformly rams a wide variety of sprocket molds from 30″ to 54″ in diameter. Their Motive Jr. Sandslinger quickly rams medium and large floor and pit molds.

A B&P representative will make arrangements for you to see these Speedmullors and Sandslingers in operation. Write today!

PROFITABLY USES

SANDSLINGERS and SPEEDMULLORS

a



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BEARDSLEY & PIPER

DIVISION OF PETTIBONE MULLIKEN CORPORATION

General Offices: 2424 North Cicero Avenue, Plant: 2541 North Keeler Avenue

CHICAGO 39, ILLINOIS

Beardsley & Piper are manufacturers of the Sandslinger • Speedslinger • Hydra-Slinger • Speedmullor • Mulbaro • Screenarator • Junior Nite-Gang Preparator • Champion Speed-Draw • Plate Feeders • Turntables • Gyratory Screens

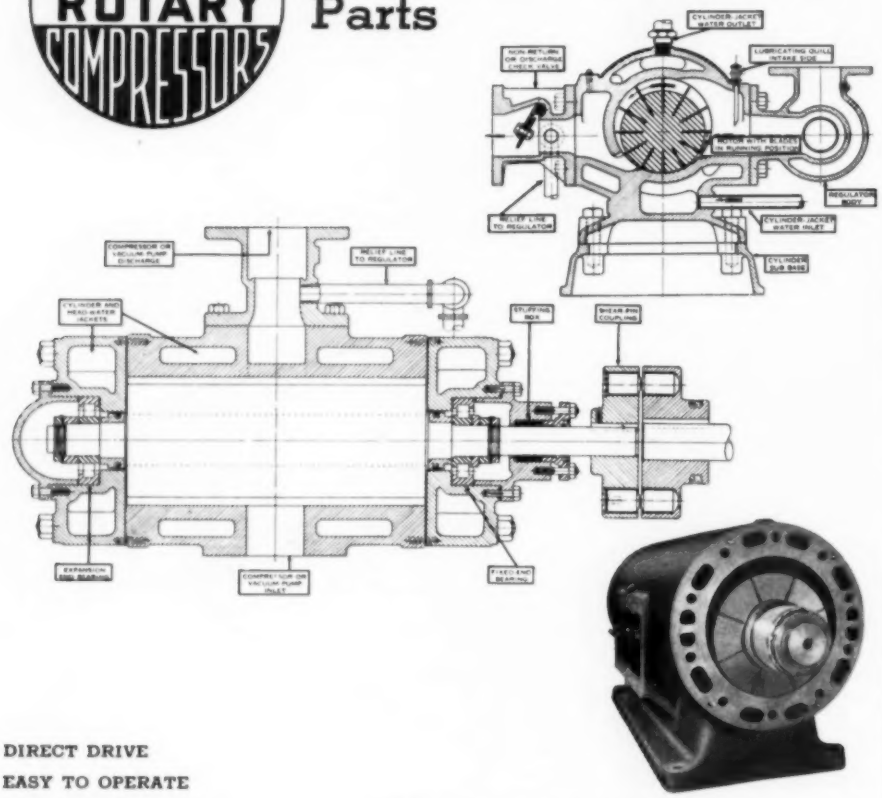
a Completely thorough mulling and cooling of *700 tons of sand per day* in 1½ minute cycles—*that* is the performance of the two Model 70 Speedmullors at Olney.

b Ramming with a Stationary Type Sandslinger pays off on heavy sprocket molds of widely varying size.

c The Motive Jr. Sandslinger proves its versatility in ramming various sized floor and pit molds. It does the job in minutes compared to hours required by hand ramming.

FULLER ROTARY COMPRESSORS

Rugged Construction · · · Simplicity of Design · · · Minimum of Moving Parts



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NO BEARING TAKE-UP

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PARTS READILY ACCESSIBLE

STURDY YET LIGHT IN WEIGHT

BLADES AUTOMATICALLY COMPENSATE FOR WEAR

NO VALVES TO LEAK OR SEATS TO GRIND

UNNECESSARY BULK ELIMINATED

MAINTAINED CAPACITIES FOR THE LIFE OF THE MACHINE

NO MULTIPLICITY OF PARTS REQUIRING FREQUENT ATTENTION, ADJUSTMENT OR REPLACEMENT

The fewer moving parts that make up any piece of equipment, the more continuous service at the lowest operating cost. Fuller Rotary Compressors are an outstanding example of simplicity of design . . . few moving parts: rotor—bearings—blades.

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Fuller Rotaries are built for capacities to 3300 c.f.m. actual free-air delivery, 125-lb. pressure. For vacuums to 29.90-in. (referred to 30-in. barometer).

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C-184

FULLER

A LIFETIME OF NEW MACHINE EFFICIENCY

(*Continued from page 172*)

serted in position. Fig. 4 shows the machine at this stage.

Pouring spouts are entered simultaneously on the spigot end of the flasks. Standard weights of metal per flask for 4-in. pipe are poured at a temperature ranging from 2600 to 2700° F while the flasks are spinning at about 800 rpm. Pouring end of the machine is shown in Fig. 5, with the pilot bearings retracted to permit pouring spots (not shown) to enter the flasks.

Centrifugal casting of the metal covers a period of about 45 seconds before solidification, after which the flasks are returned to a vertical position. In practice, air-controlled rams will be located above the machine to eject the pipe and sand from the four flasks simultaneously into a pit. The first installation of this machine also will incorporate extensive mechanization applying not only to sand handling and metal transfer and pouring, but also including a conveyor which will automatically carry away the ejected pipe and sand from the pit. All of the various steps in the cycle just described are directed from a central control panel.

Flasks are not heated excessively during the casting operation due primarily to the green sand inside the flasks which is replaced for each successive operation. The centrifugal casting process results in 100 per cent yield and provides a smooth surface inside the pipe. The Rol-O-Cast machine also produces perfectly straight pipe which is concentric in diameter. Relatively little cleaning is required on the outside surface, and neither grinding nor machining is necessary.

This machine is designed to produce 2, 3 and 4-in. ID soil pipe of single or double hubs. Another machine, possibly of two-flask construction, is in process of design for larger diameter soil pipe.

Intercommunication: Executone Inc., 415 Lexington Ave., New York 17—New intercom system is said to make possible answering paged messages from high noise level areas clearly and intelligibly. The paged message is reproduced at high volume through the trumpet station. The person replying depresses a lever on the nearest conveniently located staff station. The trumpet is automatically cut out and two-way conversation at normal voice level can be carried on between the person paged and the originator of the call. The trumpet reproducer, made of spun aluminum with gray wrinkle finish, is 10½

in. in diam and in overall length. It is equipped with adjustable mounting bracket. Staff station in matching color, designed for simple mounting on wall or partition, is 6-in. wide, 6½ in. high and 3½ in. deep.

Scale Dial: Howe Scale Co., Strongs Ave., Rutland, Vt.—Tape drive cabinet dial is intended for use with floor scales, industrial built-in scales, motor truck scales, tank scales and all types of overhead track and suspension scales. The tape drive is a positive drive mechanism, using

high strength, noncorrosive special alloy tapes to replace the rack and pinion. It is said to deliver a smooth, positive drive to the pointer and requires only minimum maintenance and service. Adjustable, self-compensating hydraulic dash-pot using a new valve-type plunger working in "Zero-Flow" oil controls the pointer action and prevents shocks from reaching the mechanism.

Paint: Speco Inc., 3142 Superior Ave., Cleveland 14—New paint which can be applied directly over rusty surfaces without cleaning or scraping is reputed to penetrate the rust layer, render it inactive and seal the surface against further rusting. Other features claimed are high resistance to chemical action and immunity to climatic changes. It is available in aluminum and black and may be painted over with any paint or enamel. Also offered is a high-heat-resisting aluminum paint designed for use in painting boilers, furnaces, condensers, compressors, ovens, stacks, engines, steam lines, exhaust manifolds and other interior or exterior metal surfaces. It also may be used for painting wood, brick or concrete surfaces. The paint film is said to form a permanently bright, elastic finish that resists moisture, corrosion, acids, alkalis and industrial fumes.

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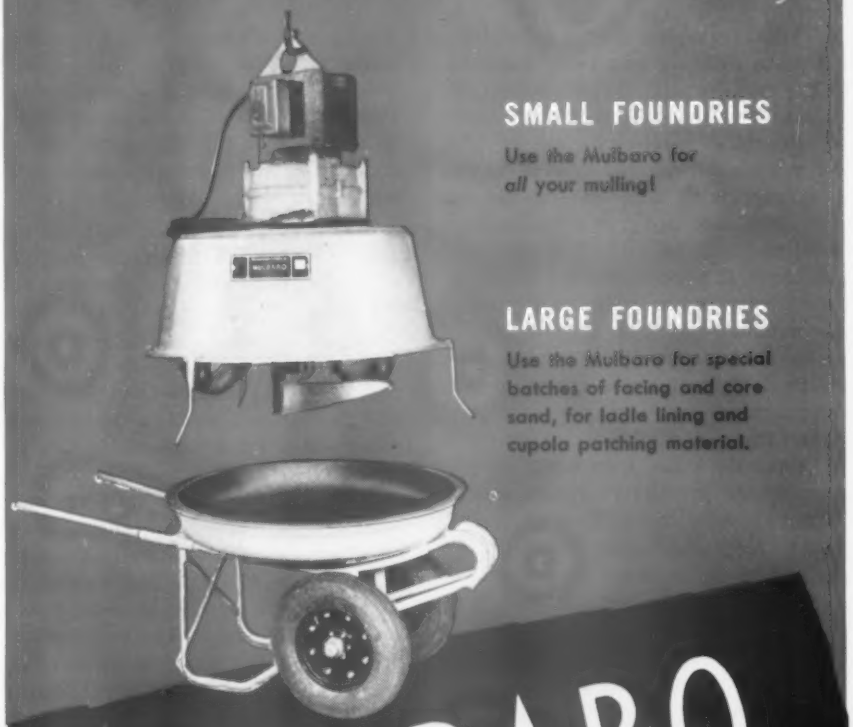

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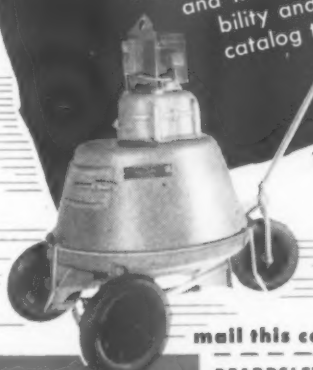

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Machine for Matchplate Molding

Eliminates Heavy Manual Operations

A NEW machine for large matchplate molding has been designed by the Osborn Mfg. Co., Cleveland, to provide lower production costs and to eliminate practically all of the heavy lifting from this type of work. It is especially adapted for use in the jobbing and semi-production foundry.

Because it makes manual handling unnecessary in the rollover operation the machine permits use of larger flasks than formerly in matchplate molding. This makes machine molding practical for jobs otherwise run on the floor, and eliminates the need for separate cope and drag operations where production requirements do not justify them. Use of larger flasks for matchplate work also would permit, in many cases, an increase in number of castings per mold.

The machine, termed the company's No. 3130 Match Plate Molding Machine, mechanically lifts and handles the mold during the rollover, drawing of the cope and pattern, and closing of the mold. When used in conjunction with overhead sand hoppers and roller conveyor leading from the machine, the heaviest lifting required of the operator is handling the pattern and flask.

Among other features claimed for the machine is its ability to handle a wide range of flask sizes and its reduction of changeover time through being rapidly adjustable. Also, mechanization of the cope drawing and closing operations is said to provide more accurate molds. No special training of operators is required in using the machine, since the sequence of operation is identical with that of standard practice in matchplate molding.

In practice the flask and matchplate are assembled on the machine with the cope on the bottom, and the drag is jolt rammed in the conventional manner. A bottom board is placed in position and clipped to the drag, preparatory to rolling over. For the latter operation the operator depresses a knee valve (Fig. 1), the rollover arms are raised and the mold is lifted by the split trunnion on the flask. Flask and bottom board then can be easily rotated. After being squeezed the cope is drawn on the return stroke of the squeeze piston, as shown in Fig. 2. The conveniently located valve on the squeeze head actuates the air clamps which firmly grasp the flange of the flask. A trigger type vibrator valve is mounted in the squeeze valve handle so that it can be operated in conjunction with the squeeze valve when drawing the cope.

Fig. 3 shows the cope swung aside so that the drag pattern can be easily drawn in the usual way. In drawing the pattern the vibrator is operated by a knee valve, leaving both hands free.

In closing the mold after the cores are set, the cope and squeeze head

1

are swung back and the drag is raised by the squeeze piston until it meets the cope. The pins are lined up automatically to provide accurate closing. After the mold is closed the drag clip and flask are removed and the finished mold is lowered on the machine table and is in position to be placed on the floor or pushed out over a roller conveyor.

The machine will be available in six models and will have 13 and 16 in. diameter squeeze pistons.

Grinding Wheels: Mansco Grinding Wheel Co., 2164 East 36th St., Cleveland 15—Process for coating each grain of a grinding wheel with a microscopically thin shell of carbon in an isotropic vitrescent form is said to make the wheels effective for grinding carbide tools and other super-hard alloys. Fast cutting is claimed with only light passes that generate little heat, thereby pre-

(*Continued on page* 180)

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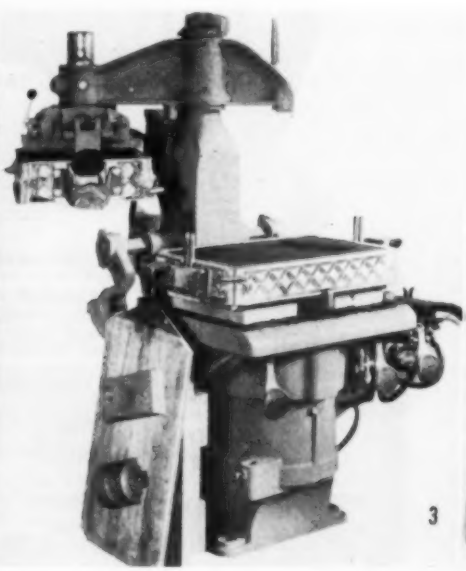
3

4

Installed in 1937

and still competitive and highly efficient today

BOTH past and present performance of the Bartlett-Snow equipment in the grey iron foundry of this large mid-western automobile manufacturer, demonstrates the ability of Bartlett-Snow engineers to accurately analyze foundry problems, and then design, build and install equipment that will repay its initial cost within a short time,—and return handsome profits to the purchaser for years and years thereafter.

The shakeout and spill sand in this foundry is collected on conveyors in the basement, passed through a rotary cooling screen, mulled and aerated. The prepared sand is then handled on an inclined 24″ belt conveyor (see view above) eliminating the need for bucket elevators, and distributed over the fly wheel line molding machines. Sand not needed by the eight molding station on the fly wheel line is carried to the head line on a cross belt, thus permitting sand to be distributed to two complete loops. The continuous mold conveyor loop shown above consists of 95 cars of Bartlett-Snow's heavy duty, two axle, four wheel design with steel plate tops 20″ wide with 5′-0″ centers.

Let the Bartlett-Snow foundry engineers, with their long and intimate experience with the needs of practical day to day foundry operation, work with you on your next sand, mold, or castings handling problem. It's your assurance that all equipment will be designed to adequately serve both present and future needs; and synchronized and coordinated into an efficient, compact, profitable and easy to operate unit. The C. O. Bartlett & Snow Company, Cleveland 5, Ohio. Engineering representatives in New York, Baltimore, Detroit and Chicago.

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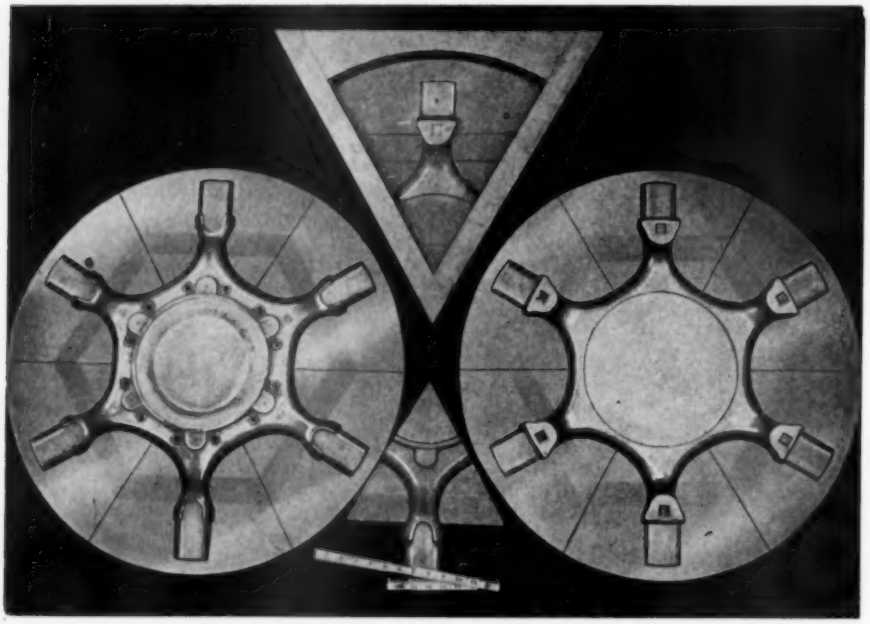
For the Foundry Industry

SAND, MOLD AND CASTINGS HANDLING EQUIPMENT

PROFIT BY OUR MANY YEARS OF EXPERIENCE



Cope and drag equipment for truck wheel, made from one spoke (1/6) of wheel.

Get More Production and Cut Costs! Use Pressure Cast Matchplates and Cope and Drag Plates

Only one master pattern does it! From it we make you single or multiple pattern matchplates, casting them under pressure in plaster molds. Why not find out exactly how much we can save you by this method, or by furnishing cope and drag plates which likewise jump production and lower your costs? Write us for quotations now.

Matchplate made from master pattern

TOLEDO MATCHPLATE COMPANY

534 State Street — Toledo 2, Ohio

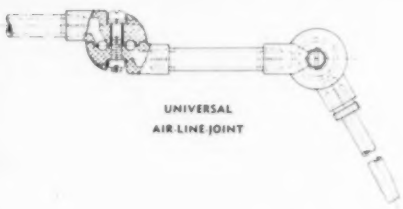
Affiliate—Plaster Process Castings Co., 6922 Carnegie Ave., Cleveland 3, Ohio

Pressure-Cast MATCHPLATES
COPE and DRAG PLATES

(*Continued from page* 178)

venting checking and cracking of the tool. Life of these wheels is said to be four to five times that of untreated wheels and produce a cleaner grind and better finish.

Universal Joint: Universal Air-Line-Joint Mfg. Co., Lafayette, Ind.—Universal fluid-line joint is designed for directing and maintaining a jet of liquid or air to any point or object in a machine operation. It



swivels 360 degrees, is made of aluminum parts streamlined to offer minimum obstruction to operator's view and weighs 3½ oz. It is claimed that machine vibration will not move it. It may be used to direct liquid coolant on saws, screw machines, lathes, and milling machines, and for use with compressed air on various types of machines.

Lift Truck: Yale & Towne Mfg. Co., Roosevelt Blvd., Philadelphia—This company has entered the gasoline-powered industrial truck field with a newly developed line of lift trucks featuring fluid drive, automotive controls, hydraulic piston lift (in two stages by means of a ram within a ram), and low mast heights with high free lifts. Fluid coupling is designed to permit progress from

slow to fast speeds, and vice versa, without operating clutch or gear-shift levers, and is said to reduce operator fatigue and wear on mechanical parts. One model has hydraulic lift constructed to permit full 66-in. lift before the telescopic mechanism begins to rise. It has a maximum lifting height of 130 in., a collapsed height of 83 in. and a 6000-

lb load capacity. A second model has free lift of 51 in., maximum lifting height of 100 in. and collapsed height of 68 in. The elevating fork carriage rides on thrust roller bearings and lifting speed is 30 fpm at full load. Trucks are powered by 6-cylinder, 65 bhp engines.

Hammers: Chambersburg Engineering Co., Derbyshire & South Main Sts., Chambersburg, Pa. — Steam or air operated general purpose hammers are made in a range of sizes from 50 to 500 lb, falling weight. They are designed to handle a wide variety of jobs from tool dressing and general light blacksmithing to emergency forging of repair parts or maintenance work. Accurate work is said to be assured where dies are employed by the integrated frame and anvil cast in one

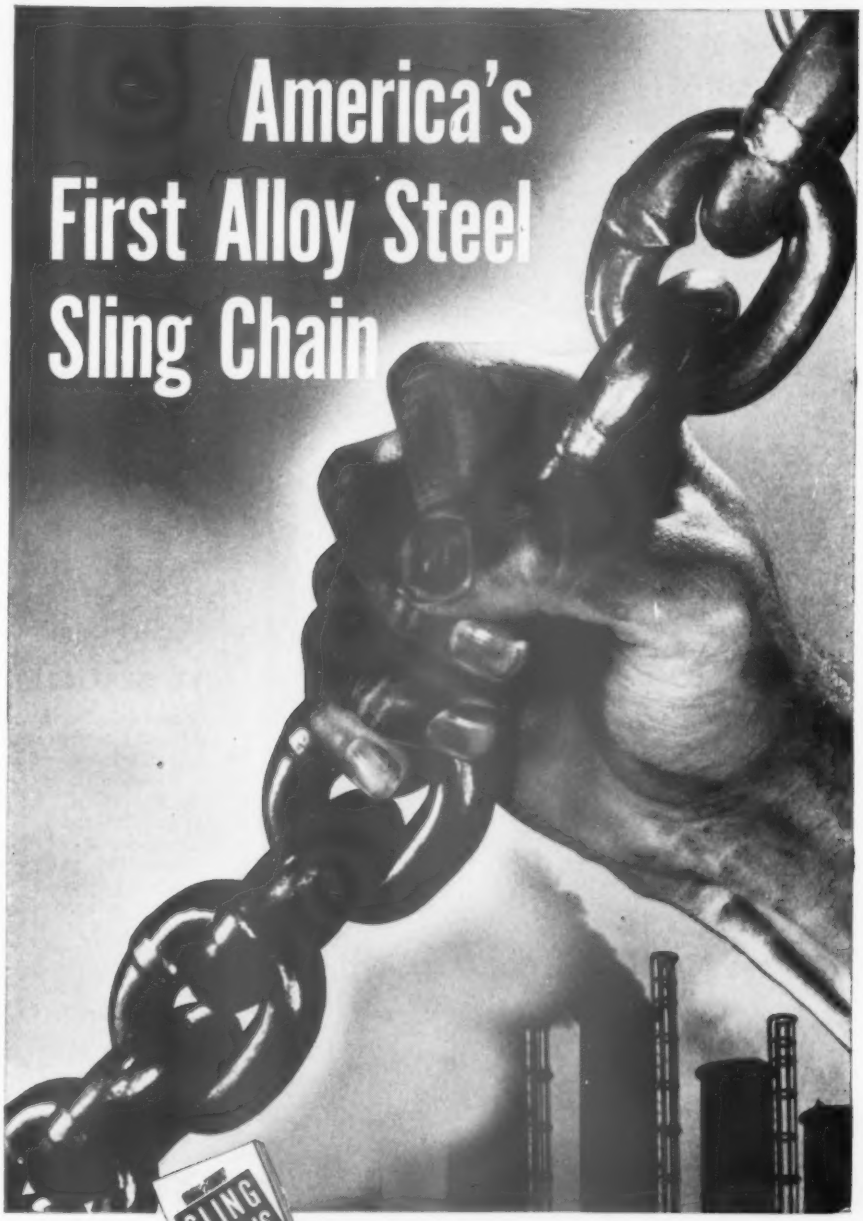
piece, preventing rock or sway. No special foundation is required for installation of the hammer.

Magnetic Starters: General Electric Co., Schenectady 5, N. Y.— Alternating current magnetic starters are designed for starting and protecting motors up to 50 hp and are furnished in all NEMA sizes from 0 through 3. Contactors can be furnished in NEMA sizes from 00 through 3. One-piece plastic encased coil enclosure protects windings against dirt, moisture or possible damage during installation. Clamp-type coil terminals are embedded in the enclosure, and the magnet armature guides move in self-lubricated vertical slots in the sides of the enclosure. The silver contacts are said to be easy to inspect, interchange, and remove without the use of special tools. Cold-molded asbestos arc

(*Continued on page* 183)

CM HERC-ALLOY

America's First Alloy Steel Sling Chain



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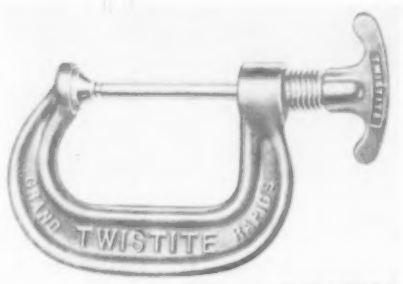
THE ROBINSON CLAY PRODUCT CO.
AKRON 9, OHIO

(*Continued from page* 181)

shield prevents arc-over between contacts. The starters are furnished either open or mounted in general purpose, watertight, dust-tight, or hazardous atmosphere enclosures.

Clamps: Richards' Industries Inc., 20 Leonard St., N. W., Grand Rapids 5, Mich. — New type "C" clamps employ a push-pull adjust-



ment that sets the pressure bar in any position from full open to full closed in an instant. An eccentric spline arrangement enables the operator to lock or unlock the pressure bar with a single twist. Pressure bar has a ball bearing foot which is said not to twist or creep or mar the material being held. Clamps come in sizes 2 to 6 in. and deep throat frame is made of heat treated aluminum. Larger sizes available on request.

Wet Cutting: Wells Mfg. Corp., P. O. Box 411, Three Rivers, Mich.—Self-contained wet cutting system for the company's No. 5 horizontal metal cutting band saw is said to permit safe use of higher cutting speeds and to increase blade efficiency. Portability of the machine is retained, inasmuch as the full area chip pan is firmly mounted between the bed and legs. Complete system includes fluid tank with centrifugal type pump-motor unit and a screened intake, as well as tubing and a conveniently located flow control valve. All working parts are said to be readily removable and easy to clean.

Safety Glove: Belle City Glove Co., 112 East Chestnut St., Chicago 11—Plastic coated and impregnated cotton fabric glove is said to be full cut and comfortable and to offer protection against chemicals, abrasion burns, flame, heat and liquids. Other features claimed are that it has high dielectric strength, is impervious to most oils, and has a nonslip gripping surface attributable to the plastic material with which it is coated.

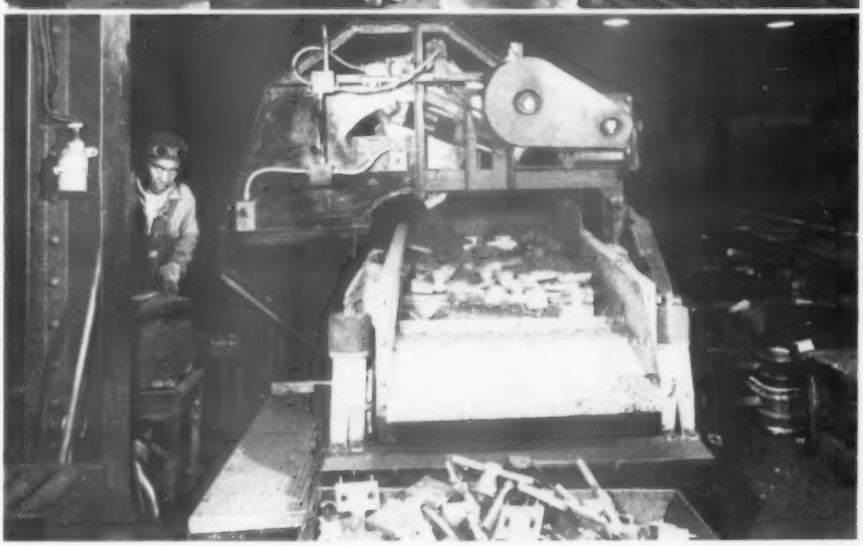
Foundry Installs New Type Portable Shakeout

A NEW portable unit for shaking out molds and handling sand recently has been installed on a squeezer floor at the Kensington Steel Co., Chicago, producer of steel castings. The squeezer floor is equipped with roller conveyors for pouring molds, but has no mechanical sand handling equipment. Previously a crew of 12 men was required for full-shift operation and some overtime was involved in moving flasks to an existing shakeout and separating castings from the sand.

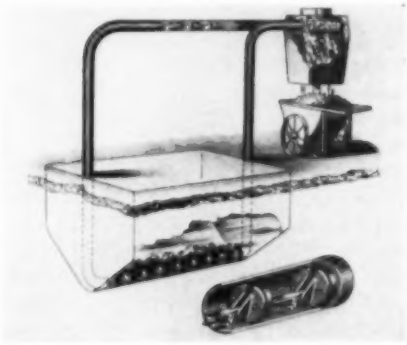
The shakeout installed is a new design developed by the Productive Equipment Corp., Chicago. It comprises a skip hoist for lifting the sand and castings onto the shakeout and a conveyor to remove the sand from beneath the shakeout and elevate it into large hoppers. The sand then can be conveyed by crane to any desired point. Two men operate the unit, which is mounted on a track for easy transfer.

As shown in the upper view, one man merely tips the mold from the roller conveyor onto the skip hoist. When the latter is full, pushing an electrical control causes the skip hoist automatically to raise to discharge the sand and castings onto the shakeout and then return to receive the next load. In this particular operation, because of longer retention of the sand in the flasks, the lumps are quite hard. The shakeout stroke is adjusted so that the castings are retained a sufficient length of time on the screen to break up these sand lumps and also to knock out virtually all of the cores in the castings.

The lower illustration shows the discharge end of the shakeout just as the skip hoist is dumping. The box containing the castings can be of any type desired—a car operating on rails or a tote box for pick-up either by crane or lift truck. Sand is conveyed from below the shakeout and up to an elevation sufficiently high to discharge into a large bucket, shown in the top view at left, or it can be disposed of in several other ways. The bucket in this case rests on a dolly on the track and moves with the shakeout unit. It is possible to discharge from the unit into conveyors or other means of sand disposal.

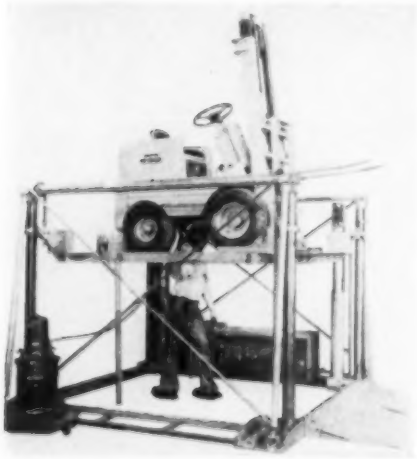


Conveyor: Honan - Crane Corp., 656 Wabash Ave., Lebanon, Ind.—Continuous, automatic materials conveyor is designed to move any material which will settle to the bottom of a tank, hopper, bin or other form of reservoir. It consists of a series of neoprene or cast iron



flights, assembled on an endless chain. The chain and flights are pulled through a pipe casing by a high torque gear transmission. The casing, custom bent to the specifications of the origin and delivery points is of 2, 4 or 6-in. diam depending upon capacity requirements. The casing has open sections at the pick-up and release points in the conveyor system.

Truck Lifter: Service Caster & Truck Corp., 691 North Brownswood, Albion, Mich.—Electric hydraulic lifter for servicing all makes of industrial trucks is built in 6000 and 12,000-lb capacities. Safety features of the lifter include hooks which lock into the legs at any point during the platform's rise, and safety



pipes which drop from the platform to the floor once the proper height is attained. Dead-man control is a further precaution. Other features are its open platform permitting complete accessibility of trucks for lubrication and maintenance work, a method of chocking truck wheels, and a special support block on which truck counterweights may rest.

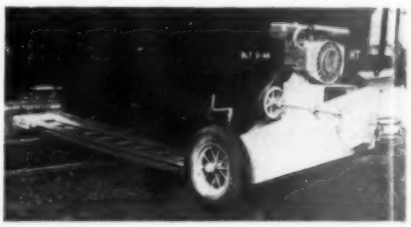
Grease: Texas Co., 135 East 42nd St., New York—Soft consistency grease for winter use in heavy duty industrial service has a lime soap base, is gold in color and is said to be particularly suitable for low temperature applications. It is designed for general purpose industrial service where higher viscosity mineral oils are required than in conventional cup greases.

Radiograph Illuminators: General Electric X-Ray Corp., 4855 West McGeoch Ave., Milwaukee — Radiograph illuminators produced by the company are being equipped with panels of translucent Plexiglas to provide the evenly diffused light so

necessary for accurate interpretation of radiographs of castings and weldments. The acrylic plastic, Plexiglas, a product of Rohm & Haas Co., Philadelphia, is used in ⅛-in. sheets measuring 14 x 17 in. It is said to have good diffusing quality, uniform density, freedom from flaws and high shatter-resistance.

Motors: Electric Machinery Mfg. Co., 821 Second Ave. S. E., Minneapolis 14—Extra low starting kva squirrel cage induction motors are available in flange-mounted type and coupled two bearing type for direct coupling to 514, 600 and 720 rpm air compressors. Motors permit full voltage starting (across-the-line) with a starting kva of 425 per cent. Full voltage starting is claimed to be better from the standpoint of power supply and requires simpler, lower cost control equipment. Motors are available in horsepower ratings from 60 to 250.

Hopper Car Unloader: Baughman Mfg. Co., Jerseyville, Ill —Hopper car unloader is driven by either electric motor or gasoline engine with power transmitted by line shaft to worm gear drive case, sealed against dirt and water. It takes material from the full width of the car and can be furnished with steel wheels 28 in. in diam or with drop



center rim wheels for 6:00 x 16 tires. Horizontal section thickness is 3⅜-in., width 20⅜-in., and length 13 ft., 6 in.; overall length is 18 ft, 8 in. and length of inclined section, 6 ft; wheel adjustment is 14 in., and height of discharging end is adjustable, 27 to 41 in.

Pyrometer: Brown Instrument Co., Wayne & Roberts Ave., Philadelphia—Photo-electronic bath pyrometer has been designed for high speed and accurate measuring of molten steel temperature at reduced production and replacement costs. The amplifying unit and 24-hr chart drive circuit are continuously energized, giving immediate response to temperature indication, when the pushbutton on the purged sighting tube is depressed, and continuous indication of last temperature reading plus the exact time the temperature was taken. Using compressed air for purging, the instrument reading for

open-hearth steels, in the range of 2900 to 3050° F, is established to correspond to the usual plant practice in measuring tapping temperatures with an optical pyrometer using an emittance value of 0.40. The sighting tube is approximately 7 ft long and has a low carbon steel cap with 0.6875-in. orifice located at the immersion end and a light sensitive cell

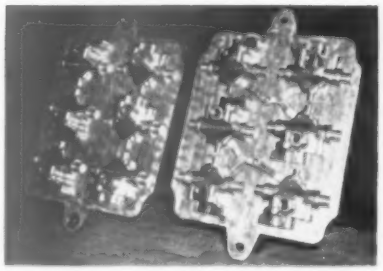
(*Concluded on page* 186)

IPW HELPS YOU GET IT!

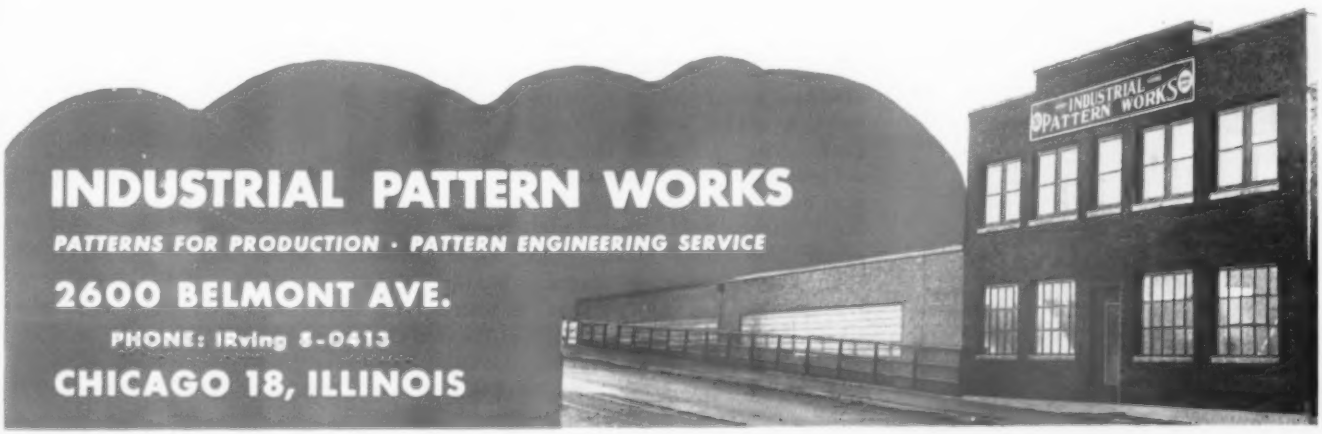
The savings in time and scrap that foundrymen strive to achieve through careful sand and metallurgical controls are frequently wasted because of poor pattern control.

Sound pattern control simply means the use of IPW all-machined, properly engineered, high precision patterns that produce dimensionally accurate castings. It also means a sharp reduction in foundry time and machine time—in foundry scrap and machine scrap. It means faster production, better work, better profits. Precision patterns give you an edge competitively, too, because high production brings down costs and prices.

IPW invites your inquiry. We'd like to show you how to cut down those costly, day-after-day scrap and machine time losses. Write today.



Typical all-machined pattern. This one consists of six brass patterns mounted on cope and drag steel plates.



INDUSTRIAL PATTERN WORKS

PATTERNS FOR PRODUCTION · PATTERN ENGINEERING SERVICE

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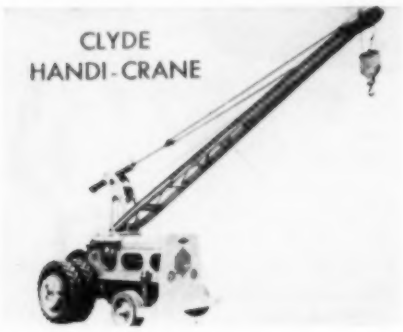
(*Concluded from page* 184)

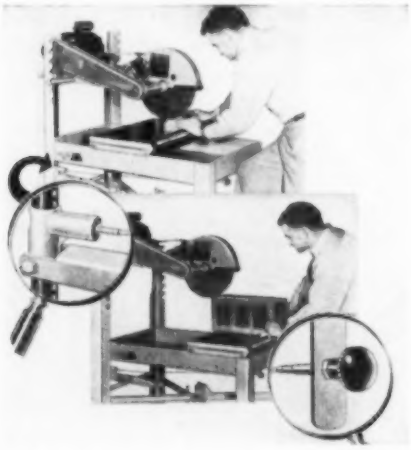
of the photo voltaic type in the other end, and interposed between are eight sight-limiting diaphragms which intercept all stray reflections from the inner surface of the inner tube section. Recorder usually is located on the instrument panel for each furnace or on a separate panel which is visible to the operator when using the tube.

Mobile Crane: Clyde Iron Works Inc., 29th Ave., West & Michigan Sts., Duluth 1, Minn.—Tractor



mounted crane has a capacity of 4 tons, five forward speeds up 12.5 mph with reverse of 1.8 mph, and a turning radius of 17 ft, 6 in. Steering is said to be easy because of a special steering gear with roller bearing knuckles. All-steel, welded boom is raised and lowered by a hydraulic cylinder that permits independent boom topping at all times. Cylinder and boom are mounted on a turntable that rides between two rows of large-diameter steel balls. Boom swings 320 degrees.

Masonry Saws: Clipper Mfg. Co., 2800 Warwick, Kansas City 8, Mo., Dept. F49—New masonry saw



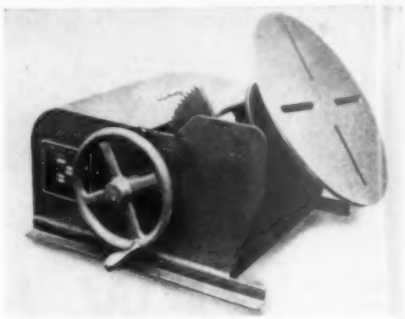
models feature a one-man adjustment device for raising or lowering the cutting head to compensate for changes in material size. They also are equipped with a snap-on blade guard cover and a ball bearing conveyor cart with aluminum alloy castings which return the flow of water on the wet cutting model. Company offers over two dozen blades for the cutting of all masonry materials.

Swing Lathe: South Bend Lathe Works, 299 East Madison St., South Bend 22, Ind.—New series of 13-in. swing toolroom and quick change gear lathes feature improved headstock spindle with increased bore and collet capacity, new tailstock base with improved bed way wiper system, and new one-point oiling system for reverse lever bracket and twin gear bearings. General specifications are: 13⅛-in. swing over bed; 7¾-in. swing over saddle cross slide; 48 pitches of screw threads—4 to 224 per inch R.H. or L.H.; 48 longitudinal power feeds—0.0015 in. to 0.0841 in. R.H. or L.H.; 48 power cross-feeds—0.0006 in. to 0.0312 in.; 8 spindle speeds—34 to 875 rpm; 4, 5, 6 or 7-ft bed lengths; 1⅜-in. hole through spindle and a maximum collet capacity of 1 in.

Welder: National Cylinder Gas Co., 840 North Michigan Ave., Chicago 11—Alternating current welder available in 12 models has a four-coil transformer with movable magnetic shunt, which is said to assure fine welding characteristics at every point within the output range, and correct ratio of open circuit to arc voltage, a provision that means faster burn-off, proper penetration, and correct breakdown of usually hard-to-handle alloy rods. Efficiency of operation is provided for by a stepless full range output control which is designed to give the precise welding heat needed. Low current welding is said to be established by the unit's high reactance windings which give added reactance and sustain proper open circuit voltage even at lowest output settings.

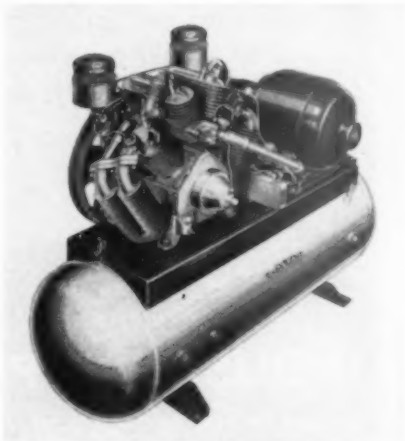
Centrifugal Fan: Westinghouse Electric Corp., Sturtevant Division, 16 Damon St., Hyde Park 36, Mass.—Centrifugal fan is said to have a static efficiency of 80 per cent. The increased efficiency was achieved by a combination of several design changes in the fan's blading, wheel, inlet, back plate and scroll, the spiral housing that surrounds the revolving blades. Modifying that housing so that it was steeper at the point closest to the wheel permitted closer conformity to the natural air flow and was the chief cause of the improved performance and quieter operation. The new fan is available in 23 sizes with wheels ranging from 1 to 9 ft in diam

Work Positioner: Ransome Machinery Co., South Second St. Dunellen, N. J. — Motor-operated work positioner is driven by a ½-hp single phase ac motor through a hydraulic, variable speed transmission. It has a load capacity of 100 lb and the table top rotates 360 degrees at variable speeds, adjustable from 0-5

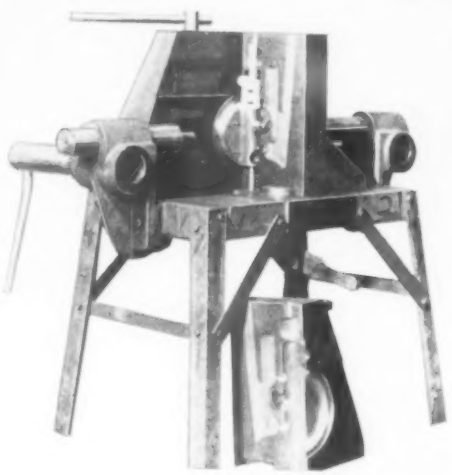


rpm in either direction. It is manually tilted through 135 degrees and locks at any degree of tilt by a worm-and-segment.

Air Compressors: Wayne Pump Co., Tecumseh St., Fort Wayne 4, Ind—Two-stage, V-type air compressors are available as 7½ or 10 hp units providing 30 and 40 cu ft displacement at 175 lb pressure and 37 to 50 cu ft displacement as low pressure models (100 lb). The 4-cylinder units come mounted on bed plate only or on 80-gal tanks. Bore and stroke of the low pressure cylinder is 4¾ x 3 in. The 7½-hp compressor operates at 490 rpm and



the 10-hp model at 650 rpm. They are equipped for fully automatic operation with pressure control switch, pressure gage and across-the-line starter.



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Annual Meeting of Aluminum Group

At the annual meeting of the Aluminum Association, held in New York Jan. 18-20, R. S. Reynolds Jr., the Reynolds Metals Co., Richmond Va., was elected president. The following were elected vice presidents: E. G. Grundstrom, Advance Aluminum Castings Corp., Chicago; M. E. Rosenthal, United Smelting & Aluminum Co. Inc., New Haven, Conn.; and George N. Wright, the John Harsch Bronze & Foundry Co., Cleveland. A. V. Davis, Aluminum Co. of America, New York, was re-elected chairman of the board of directors of the association, and Donald M. White was reappointed secretary-treasurer.

Three directors-at-large were elected to the board, to serve for three-year terms: Frank B. Cuff, Aluminum Co. of America, New York; R. G. Farrell, New York, of Fairmont Aluminum Co., Fairmont, W. Va., who has just completed two terms as president of the association; and W. A. Singer, Apex Smelting Co., Chicago.

The association's foundry, extrusion, and sheet divisions also held sessions during the three-day meeting. George N. Wright, the John Harsch Bronze & Foundry Co., Cleveland, was re-elected chairman of the foundry division, and H. J. Hater, Aluminum Industries Inc., Cincinnati, was appointed to represent the division on the association's board of directors.

Member companies of the Aluminum Association account for all of the primary aluminum production in the United States and about 85 per cent of aluminum semifabricated products.

National Foundry Committees

Appointment of two committees to serve the National Foundry Association for the current year has been announced by the new president, Franklin Farrel III, secretary, Farrel-Birmingham Co. Inc., Ansonia, Conn.

The following have been named members of the Executive Committee: Harry E. Ladwig, Allis-Chalmers Mfg. Co., Milwaukee, vice president of NFA; I. Richards Wagner, Electric Steel Castings Co., Indianapolis; Herman Menck, Harnischfeger Corp., Milwaukee, and Edward C. Hoenicke, Eaton Mfg. Co., Detroit.

The Promotional Activities Committee will be headed by Mr.

Hoenicke, who has been appointed chairman. Other members include Henry S. Faust, Hansell Elcock Co., Chicago, and G. E. Tisdale, Zenith Foundry Co., West Allis, Wis.

Seek Standardization Of Flask Items

Foundry Equipment Manufacturers Association, Engineers Building, Cleveland 14, through its Flask Manufacturers Product Group, is seeking suggestions which will aid the group in its efforts to standardize certain items pertaining to the manufacture of flasks. Flask manufacturers believe there is opportunity to assist users of pattern equipment as well as to effect savings on the part of producers through such standardization.

As a start in this movement consideration has been given to maximum and minimum sizes of dowel pins and pin center dimensions, and to the elimination of ½-inch sizes in the width and length of slip pop-off flasks. The reactions of pattern manufacturers and others concerned with the subject is sought on the foregoing points. Study of other flask items will be taken up later.

Gray Iron Founders Form New Group

Management executives of most the gray iron foundries in northeastern Michigan elected R. W. Foster, Bay City Foundry Co., Bay City, Mich., as chairman, secretary and treasurer of a newly organized management group of the Gray Iron Founders' Society. Robert Holth, Littite Foundries Inc., Port Huron, Mich., was elected vice chairman. Succeeding meetings of the group will be held the first Thursday of each month.

Book Review

Wear, As Applied Particularly to Cylinders and Piston Rings, by Dr. F. P. Bundy, T. E. Eagan and Ralph L. Boyer, cloth, 129 pages, 6 x 9 in., published by Kokosing Press, Mt. Vernon, O. Price $3.50.

Theory of friction and wear of piston rings and cylinder walls is discussed, and constant pressure wear tests and variable pressure tests with a new wear-test machine are described in the section by Dr. Bundy.

The section by Mr. Eagan deals with the theoretical considerations of wear and describes results of wear testing done by the Cooper-Bessemer Corp. Mr. Boyer discusses design aspects of cylinder and ring wear.

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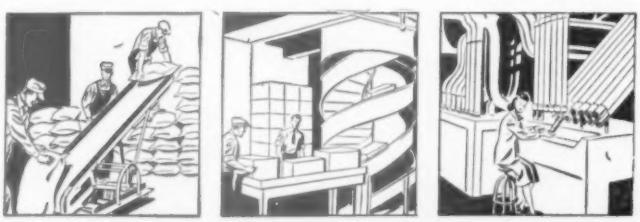

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OK St. Louis-

FOR the second time in its history The American Foundrymen's Society has chosen the great city of St. Louis as the 1949 convention city. These four days of technical sessions and important meetings will be of outstanding interest to all foundrymen. There is no question that there will be not only the meetings and discussions on foundry practice, but also on the important part cast metals are playing in this nation's every-day life and in the economic pattern of nations throughout the world.

The facilities of St. Louis to handle a meeting of this size and importance are well known and the activities of the St. Louis Chapter of the A. F. S. are already well under way to insure the success of these meetings and the accommodation of the many foundrymen who will be in attendance.

FOUR IMPORTANT DAYS

HERE WE COME AGAIN!

MAY 2-3-4-5, 1949

53rd Annual

FOUNDRY CONVENTION AND CONGRESS

THE FOUNDRY

FOR MAY

THE PRE-CONVENTION ISSUE

This issue of THE FOUNDRY will constitute a complete preview of these important days and will contain information of interest and importance to the entire foundry industry — a complete resume of the program of meetings and an outline of the congress which will again this year be held in conjunction with the convention. All this in addition to the regular features to be found in any issue of THE FOUNDRY.

FOR JUNE

THE POST-CONVENTION ISSUE

Of unusual importance this year will be the Post-Convention issue of THE FOUNDRY, reporting the many technical meetings with particular attention to the discussion of the part cast metals are playing in our industrial picture. The contents of the June Post-Convention of THE FOUNDRY will be valuable reading for all foundrymen whether they can attend the convention or not.

NOTE: To all manufacturers and suppliers who in any way contact, sell and serve the foundry industry, these two issues of THE FOUNDRY present an invaluable advertising opportunity geared to important advancement in foundry practice and at a time when the eyes of the entire industry are turned on the St. Louis convention.

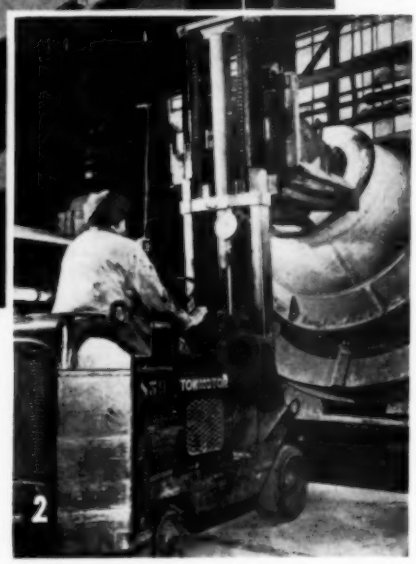
• • MAY 2-3-4-5 • 1949

PUBLICATION CLEVELAND 13, OHIO

Mechanical Handling Speeds

FURNACE CHARGING

By FRANCIS A. WESTBROOK



Figs. 1 and 2—Lift truck equipped with special device for dumping furnace charges

SANDUSKY Foundry & Machine Co., Sandusky, O., which manufactures, among other things, extremely large diameter centrifugal bronze castings, has modernized its mechanical handling so that it has cut the charging time of its rotary melting furnaces by some 80 per cent and saves 12 man-hours daily in the handling of scrap. It has also provided more efficient handling of comparatively small loads formerly moved by equipment designed for much heavier work; and has made it possible to perform a variety of handling operations with safety and dispatch even in restricted areas.

The new equipment placed in service for this work consists of fork lift trucks, some of which are specially equipped for charging the furnaces. This latter operation is shown in Figs. 1 and 2, in which a bucket holding 2000 pounds of scrap, or returns, and new metal is being emptied directly into the furnace.

These buckets and their holders were designed by the foundry engineers and were made locally. Two parallel pieces of channel iron on the bottom of the buckets provide means for lifting with the forks. The latter are specially made of two triangular pieces and have trunnions on each side to hold the buckets so that they may be tilted to discharge their contents into the furnace. There is also a locking device to hold the bucket in the tilted position and a lever which, when released, causes the bucket to tilt, as shown in Fig. 1. All this is readily controlled by the truck operator who does not need to leave his seat at any time. The special attachments used here show how simple it may be to adapt an item of standard equipment to local requirements.

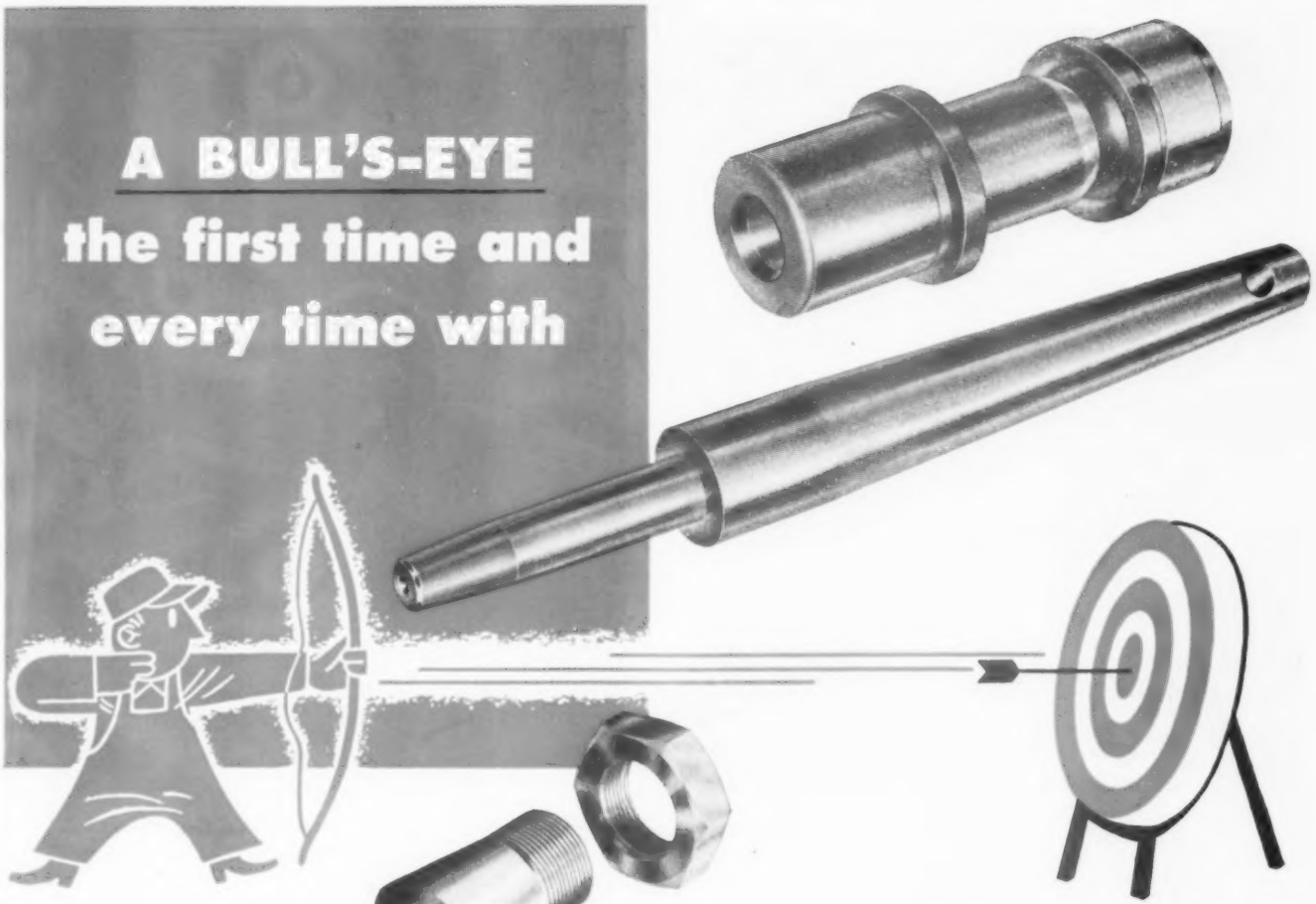
In the procedure which this equipment replaces four men were employed to gather together scrap and shovel it into containers which were then wheeled to the waiting area and dumped. To charge the furnaces the scrap was again shoveled into wheelbarrows and taken to a movable stone slab under each furance and dumped a second time. It was next shoveled, for the third time, into the furnace. A full furnace charge totals about 10,000 pounds and a shovelful of the usual machine returns weighs 30 to 40 pounds. The fact that each charge was shoveled three times indicates the considerable amount of manual labor involved.

The new procedure consists of having one man gather the machine returns and place them directly in the new buckets designed for handling by the fork lift trucks. The trucks used for this service do not have the special forks designed for dumping the buckets, and are lighter than those used for charging. When the buckets have been filled they are picked up by one of these trucks and deposited in the storage area, involving an average trip of about 100 yards. Fig. 3 shows a bucket of machine returns being picked up in the machine shop. Three men are thus saved and the job is done in three hours less time.

When a furnace is to be charged, a lift truck with the special bucket-holding device picks up buckets prepared for a heat, as will be explained, in the storage area and takes them to the waiting area adjacent to the furnaces. When enough buckets have been asembled for a full charge the furnace is raised to its vertical positon. The lift truck picks up a bucket and empties it into the furnace. This entire operation takes

(*Concluded on page* 194)

A BULL'S-EYE
the first time and every time with



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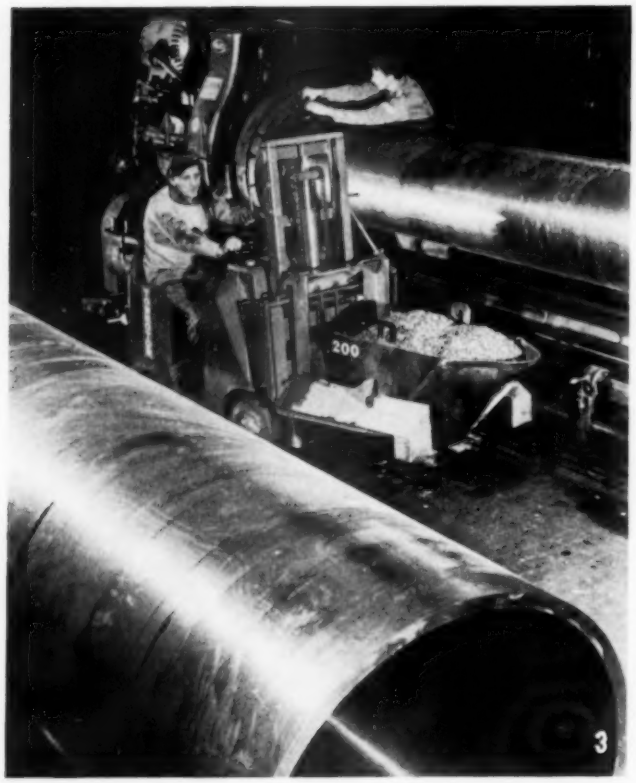

Fig. 3—Turnings are accumulated in buckets for easy transportation by truck to storage area and subsequently to melting department for charging

Fig. 4—Handling relatively small castings by truck saves overhead crane for other duties. (All photos courtesy of Towmotor Corp., Cleveland)

(*Concluded from page* 192)

only three to four minutes and the services of only one man. The old manual method required 20 to 30 minutes and four men. In other words, the saving in time alone is 80 per cent, not to mention the saving in labor. In addition, there are very definite advantages from the standpoint of safety through eliminating so much heavy shoveling.

Since gathering and storing the machine returns has been so greatly speeded up there is now time to make up the furnace charges in the late afternoon for the next day's heats. In this way it is practicable to fire and charge the furnaces the first thing in the morning, an operating detail helpful to improve overall plant efficiency.

Fig. 4 shows another use for the lift trucks. In this case the truck is moving a comparatively small bronze casting which was formerly handled by a 20-ton crane, which is much more suitable for handling the large paper mill suction rolls seen in the foreground of the photograph. Another job now performed by fork lift trucks is to transport lathe turning heads to the sharpening machine, a distance of about 300 feet. They weigh no more than 50 pounds but were formerly handled by a 20-ton crane. This sometimes tied the crane up for as much as 45 minutes, and at best was a decided drag on the service it was supposed to render in loading the lathes, handling large castings and doing the other work for which it was designed.

As all of this lighter handling has been taken over by the lift trucks the down time of the lathes has been reduced materially and the small handling has been substantially speeded up.

Other work handled by these trucks includes the unloading of metal ingots and molding sand from freight cars and the carrying of castings to the heat treating department, placing them in the annealing ovens, and transporting them elsewhere about the plant. In other words, this type of mobile handling equipment is sufficiently versatile to be an important factor in maintaining a high degree of efficiency in many of the production operations.

Book Review

Managerial Control of Business, George T. Trundle Jr., editor in chief, 408 pages, published by John Wiley & Sons, 440 Fourth Ave., New York 16. Price $5.

For a number of years, many industrialists have enjoyed the series of small booklets entitled "Trundle Talks," prepared by George T. Trundle Jr., president, Trundle Engineering Co., Cleveland, because the author has a way of putting over his ideas on business management. Short and to the point, these messages to management pinpoint some of today's problems.

Now, Mr. Trundle, with the aid of eight of his associates, has prepared a book which covers the entire field of business management. After considering briefy the economics of business, this text discusses the problems of management under the following sections: Analyzing the company operation; general management problems; sales management; manufacturing; and industrial relations.

Much of this book should be of particular interest to foundrymen. With the period of greater competition arriving, special interest should develop in a study of markets, selling methods, selling costs, and the training of salesmen. Need for greater production control should direct attention to manufacturing problems, including organization, methods, plant layout, maintenance and the control of production, labor, inventory, quality and expense. Other chapters provide equally interesting topics for discussion.

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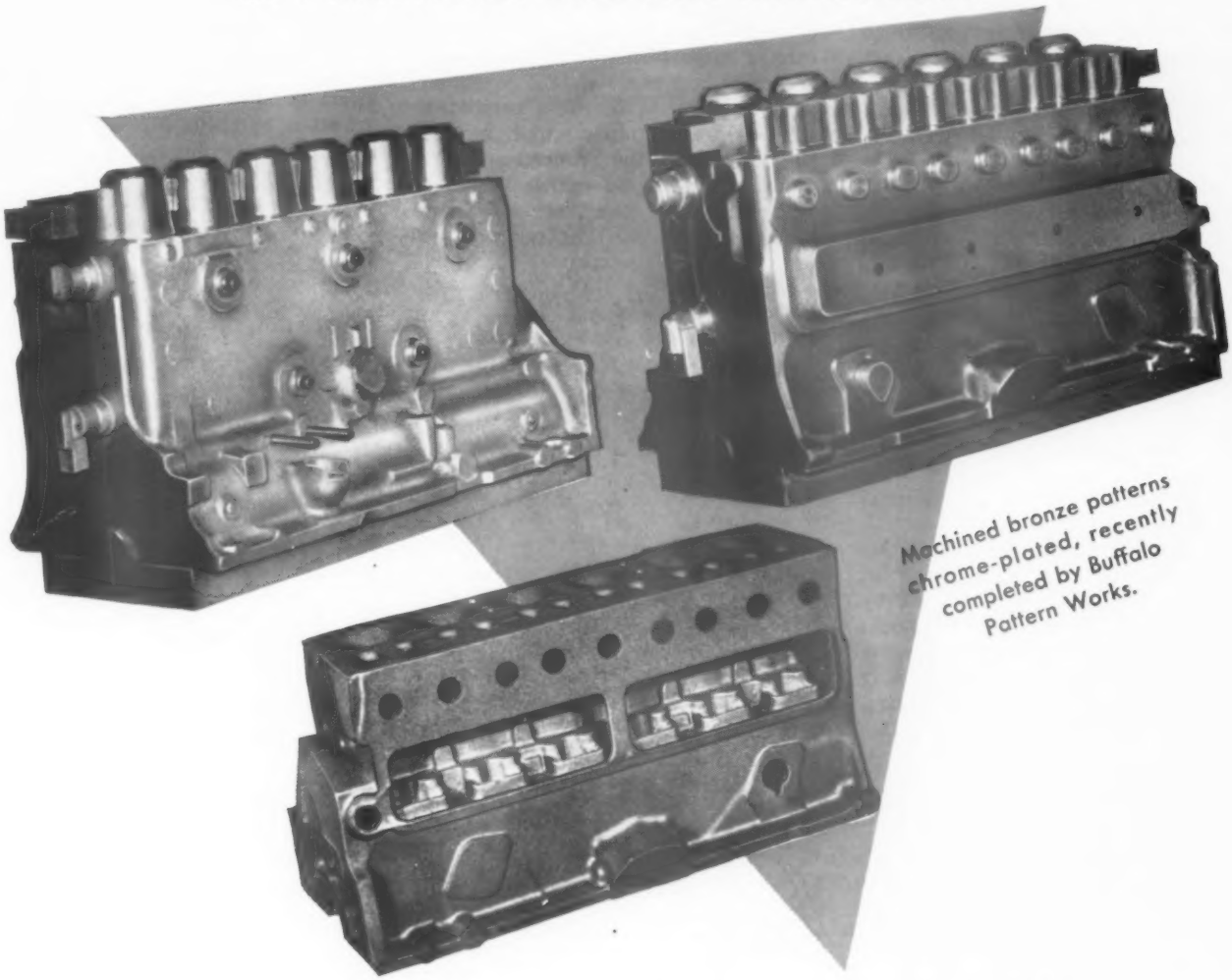

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830 HERTEL AVE. . BUFFALO, N. Y. RI. 3512

INVESTMENT MATERIALS

For Industrial Precision Casting

By THOMAS E. MOORE
Ransom & Randolph Co.
Toledo, O.

INVESTMENT materials are of great importance to the success of a precision casting foundry. A number of companies are engaged in the manufacture of those materials and several different types with varying characteristics are available to foundrymen.

In general, an investment material contains two major constituents—a refractory and a binder. When mixed with water or other suitable vehicle, the satisfactory investment will become a mass sufficiently plastic to be formed easily into a mold. It must have sufficient working time to allow for convenient handling, and then set into a hardened mass with reasonable speed. Grain size should be graded so that the larger particles will not settle in the mold before the mass thickens, and after it is burned out the structure must be permeable enough to allow easy and complete filling of the mold cavity with the metal.

The investment material should not contain impurities which would be injurious to the metal being cast, and it must not be fused by the molten metal. It must not crack or fracture during the dewaxing and mold heating, and should withstand cooling to as low as room temperature before casting the metal. It must be strong enough not to be eroded by escaping steam and wax, but it should break up easily after the metal has solidified so that the casting may be removed without difficulty. Setting and thermal expansion properties should be uniform.

Investment practices at Precision Metalsmiths Inc., Cleveland, whose operations were described in THE FOUNDRY, February, page 80, call for the use of two distinctly different types of investments depending upon the melting point and composition of the alloy to be cast. One is called a low temperature investment, which is used for casting the alloys that melt below 2000° F. The other is called a high temperature investment and is used for casting alloys that melt at temperatures over 2000° F.

The low temperature investment used contains as refractory a mixture of three forms of silica—quartz, tridymite and cristobalite. The binder is alpha gypsum (calcium sulphate). It also contains other minor ingredients to control the properties of the material. The liquid vehicle is water.

Fig. 1 shows the thermal expansion curve for the low temperature investment, the properties of which are as follows:

Water-investment ratio . . . 42/100 by wt
Initial setting time . . . . . 15-18 min
Setting expansion 0.33%
Thermal expansion (investment heated to 1200° F) . . . . 1.00% max
Tensile strength (2 hr after mixing) . . . . . 105 psi
Tensile strength (7 days after mixing) . . . . . 185 psi
Compression strength:
- At room temperature, 2 hr after mixing . . . . . 400 psi
- At room temperature, 7 days after mixing . . . . . 950 psi
- Heated to 1200° F . . . . . 265 psi

For casting the high melting alloys (those melting at 2000° F or over) two investments are used: A precoat, and an outer investment to fill the flask and back up the precoat.

The precoat contains quartz as the refractory and a binder which is a soluble silicate having a carefully controlled pH. A wetting agent also is incorporated in the precoat which acts as a surface tension reducing agent on the surface of the wax.

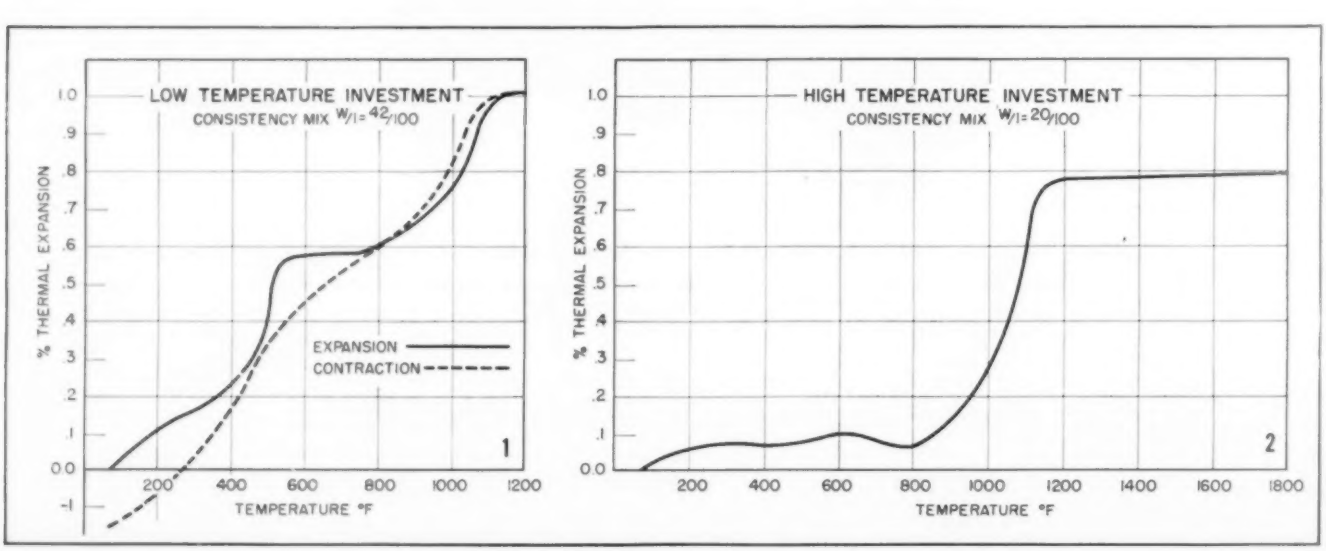
The backing up investment contains two forms of silica as the refractory—quartz and tridymite—and the bonding agent is a mixture of soluble acid phosphates and fused metallic oxides. The liquid vehicle is water.

The thermal expansion curve for this high temperature investment is shown in Fig. 2. Physical properties of the investment are:

Water-investment ratio . . . 20/100 by wt
Initial setting time . . . . . 30-40 min
Setting expansion 0.20%
Thermal expansion (investment heated to 1200° F) . . . 0.78% max
Compression strength:
- At room temperature, 4 hr after mixing . . . . . 150 psi
- At room temperature, 24 hr after mixing . . . . . 280 psi
- Heated to 180° F, 16 hr after mixing . . . . . 600 psi
- Heated to 1400° F . . . . . 250 psi

Apprentice Reunion

Arrangements are being made for the fourth reunion and banquet of Brown & Sharpe Mfg. Co. graduate apprentices which will be held at the Sheraton-Biltmore Hotel, Providence, R. I., May 21. About 400 graduates from various parts of this country as well as from foreign countries attended the third reunion in 1946, and it is expected that a larger number will get together this year.



Continuous Grinding . . . when Time is THE Factor!

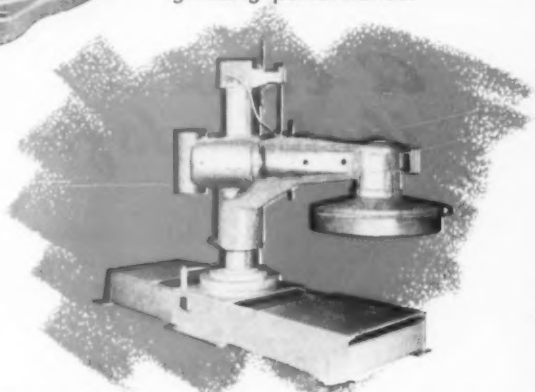
MILWAUKEE CORE GRINDERS
Give You *Accurate* Cores, *Faster!*

When you're really hurried to finish that grinding job you can depend on MILWAUKEE CORE GRINDERS to come through for you. They grind cores down to extreme accuracy to maintain uniform metal thickness . . . and they grind away without interruption. No "downtime"! Maintenance is reduced to a minimum. Milwaukee Core Grinders continue in operation producing high-quality cores with very little attention from the operator. They do a better grinding job, faster, at lower cost.

MILWAUKEE Rotary Type Core Grinder — Grinds at 3 separate speeds, handling cores up to 72" in diameter. Wheel arm locks for continuous grinding of small cores or oscillates over entire table for large cores. Versatile operation and smooth grinding performance.

Pay for a Milwaukee Grinder While You GRIND Out PROFITS!

There is no need to operate old, obsolete or makeshift grinders in your core room. Install modern Milwaukee Core Grinders. They are self-liquidating. As you grind quality cores, you "grind out" extra profits . . . profits that pay for the Core Grinders while they work for you. Write today for complete details of Milwaukee's liberal "PAY-FROM-PROFIT" Plan.



MILWAUKEE Dual Type Core Grinder — Handles wide range of intricate and cumbersome cores. Effective cutting diameter 38". This grinder's adjustable wheel arm swings progressively around a 360° circle to accommodate cores at two grinding stations. The wheel arm locks for continuous grinding.

CORE BLOWERS • CORE GRINDERS • MOLDING MACHINES • BRIQUETTING PRESSES

MILWAUKEE Foundry Equipment Co.

3236 W. PIERCE STREET, MILWAUKEE 4, WISCONSIN, U.S.A.

It's Performance that makes the stars

A blast cleaning abrasive that leads from every angle

SHOT **GRIT**

All Screen Sizes • Immediate Shipment

THE CLEVELAND METAL ABRASIVE CO.

Main Office and Plant: 880 East 67th Street, Cleveland 8, Ohio

Howell Works—Howell, Michigan

MALLEABLE FOUNDRY BROUGHT UP TO DATE

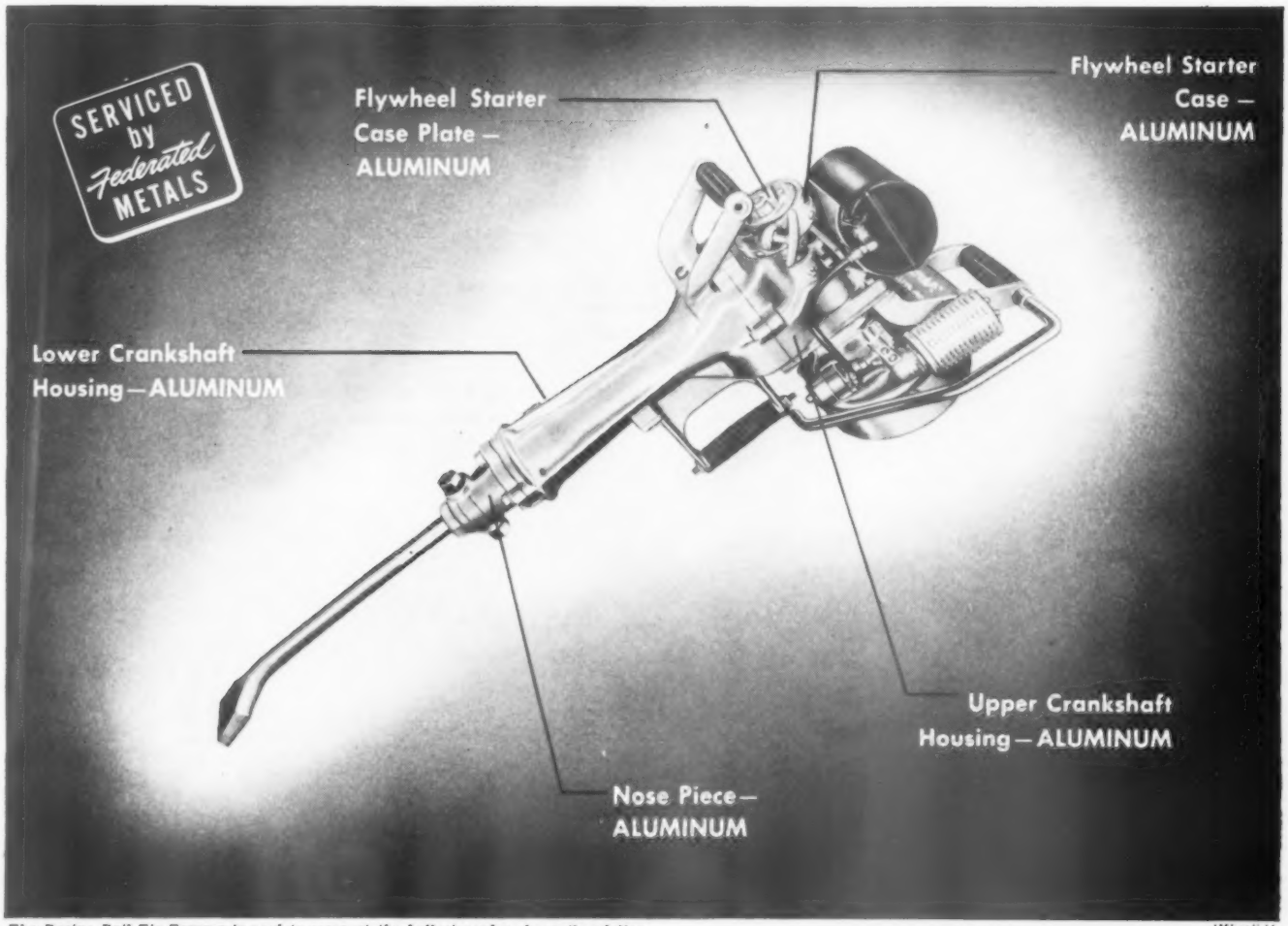
(*Concluded from page* 79)

one of two magnets and discharged into pans carried on a trolley conveyor which transports them to the melting department. Magnets are mounted diametrically opposite on a member which is pivoted in the center. They rotate in a horizontal plane and are synchronized with the travel of the pans so that the magnet over the circular conveyor is energized or magnetized while that over the pan is demagnetized.

Buckets containing the castings are transported by trolley conveyor to the annealing department, which is 700 ft long and 100 ft wide. Nineteen open-bottom annealing furnaces are located along one side of the building. They are gas-fired radiant tube type with the tubes vertical instead of horizontal. Furnaces are elevated about 12 ft above the floor, and inside dimension is 6 x 18½ ft. Castings are piled on brick-covered cars and then pushed under the row of furnaces onto an electrically operated transfer car, which moves it to any one of the 19 furnaces. Car or bottom containing the castings is elevated to the furnace by four electrically driven locomotive-type jack screws located on the corners of the transfer car. After locking bars are placed in position to hold the bottom to the furnace proper, the screws are lowered, and the transfer car is ready for another operation.

About 20 tons of castings are placed in each furnace, and the cycle is to heat to 1600 to 1750° F and hold for 30 hr. Castings next are cooled rapidly to 1400°, and then at the rate of 4° per hr until they reach 1280°. Then the load is removed from the furnace and allowed to cool to room temperature. Castings are placed in 500-lb capacity steel buckets and carried by overhead rail to the finishing department.

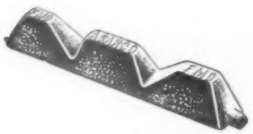
In the latter department the castings are dumped into two parallel rows of bins elevated about 30 ft above the floor. The grinding machines are located on the outside of the rows and close to them, 15 to a side. Three bins are allocated to each grinding machine. After the grinding operation the castings are put into 1500-lb capacity wagons and are transported and dumped directly into abrasive blast tumbling machine. From the abrasive blasting units the castings are sent to the shipping room or, if straightening is required, that operation is performed on drop hammers and coining presses.


SERVICED by Federated METALS
Flywheel Starter Case Plate — ALUMINUM
Flywheel Starter Case — ALUMINUM
Lower Crankshaft Housing — ALUMINUM
Upper Crankshaft Housing — ALUMINUM
Nose Piece — ALUMINUM

The Racine Rail Tie Tamper is used to compact the ballast used under railroad ties

JMLcoF-14

HOW ALUMINUM SAVES MANPOWER



To reduce operator fatigue and increase efficiency, the Racine Tool & Machine Company, of Racine, Wisconsin, had to cut weight on their Rail Tie Tamper. Three years of testing brought them to the use of a Federated aluminum alloy in casting several important tool parts.

The problem of alloy choice was difficult because the terrific pounding received by the tool required an alloy of *high impact strength, high yield strength,* and a *high proportional limit.*

Three years of experiment and test by Racine engineers and Federated metallurgists produced the desired results. Federated aluminum alloy F-430, heat treated, is used for the parts of the tool highlighted above. Tool weight is down . . . performance is up . . . operator fatigue is reduced.

The complete metallurgical and service facilities of Federated are at YOUR command, too. See Federated for the first in service and the first in products—copper-base alloys, aluminum and magnesium alloys, bearing metals, solders, die casting alloys and fabricated lead products. 24 sales offices across the nation.

Federated — first in the non ferrous field FMD

Federated METALS

Division of American Smelting and Refining Company, 120 Broadway, New York 5, N.Y.

FOUNDRY STATISTICS

Index of Foundry Equipment Orders

Foundry Trades Only
(Net Orders Closed, New Equipment)

	1947	1948
Jan.	466.9	380.9
Feb.	472.5	367.3
Mar.	532.3	326.2
Apr.	445.9	412.0
May	525.9	388.5
June	658.9	376.8
July	426.1	456.3
Aug.	411.3	324.7
Sept.	393.1	273.5
Oct.	438.2	296.0
Nov.	286.1	284.4
Dec.	467.8	....

Note: Figures are percentages of the base period 1937-1939 taken as 100 per cent (monthly average). Source: Foundry Equipment Manufacturers Association.

Estimated Number of Foundry Production Workers

Type Foundry	Oct. 1948	Sept. 1948	Oct. 1947
Gray Iron	115,600	114,900	113,100
Malleable Iron	38,500	36,600	36,100
Steel	75,000	74,700	66,200

Source: Bureau of Labor Statistics. Estimates adjusted to Federal Security Agency data through 1945.

Castings Production

In Philadelphia Federal Reserve District
(December, 1948)

Type	Percentage Change From: Nov., 1948	Dec., 1947
Gray Iron	+ 3.6	— 3.1
Malleable Iron	+19.2	—36.2
Steel	+ 8.4	+11.9
Nonferrous	+ 1.0	+23.3

Source: University of Pennsylvania.

Average Earnings and Hours of Foundry Workers

Type Foundry	Average Weekly Earnings Oct. 1948	Sept. 1948	Aug. 1948	Average Weekly Hours Oct. 1948	Sept. 1948	Aug. 1948
Gray Iron	$59.73	$59.44	$58.26	40.4	40.2	40.3
Malleable Iron	61.58	59.28	59.44	40.5	39.3	40.2
Steel	63.31	60.93	61.79	41.0	39.8	41.4

Source: Bureau of Labor Statistics.

—SHIPMENTS OF CASTINGS—

(Reported by Bureau of the Census)

Gray Iron Castings

(Net tons)

	Shipments Total	Shipments For Sale	Unfilled *Orders
1946			
TOTAL	10,269,657	6,102,246	.....
1947			
July	912,939	519,137	2,675,138
Aug.	951,859	550,961	2,631,273
Sept.	1,025,089	590,702	2,679,858
Oct.	1,154,192	654,426	2,668,781
Nov.	1,020,239	561,660	2,687,244
Dec.	1,066,211	587,933	2,782,236
TOTAL	12,540,960	7,181,299	.....
1948			
Jan.	1,084,335	584,238	2,802,685
Feb.	1,024,450	571,406	2,769,408
Mar.	1,169,085	659,821	2,726,415
Apr.	1,051,083	584,989	2,690,893
May	992,692	555,728	2,601,626
June	1,072,040	597,624	2,587,081
July	914,464	490,359	2,601,084
Aug.	1,050,948	597,678	2,598,789
Sept.	1,088,051	615,978	2,587,385
Oct.	1,148,422	642,485	2,522,831
Nov.	1,099,827	606,380	2,406,737

* For sale only.

Steel Castings

(Net tons)

	Shipments Total	Shipments For Sale	Unfilled *Orders
1946			
TOTAL	1,432,049	1,043,358	.....
1947			
July	116,956	85,014	473,923
Aug.	120,405	88,719	478,649
Sept.	137,457	102,913	526,229
Oct.	148,358	111,288	497,344
Nov.	130,125	97,143	493,309
Dec.	148,124	110,970	489,364
TOTAL	1,625,055	1,203,504	.....
1948			
Jan.	141,068	108,282	491,745
Feb.	142,434	107,762	497,097
Mar.	162,891	125,550	508,822
Apr.	150,306	114,896	472,370
May	143,337	111,616	482,531
June	152,894	117,794	469,973
July	120,445	87,927	497,410
Aug.	140,223	107,538	472,481
Sept.	149,222	112,551	447,972
Oct.	152,983	114,819	424,460
Nov.	146,835	110,275	395,013

* For sale only.

Malleable Iron Castings

(Net tons)

	Shipments Total	Shipments For Sale	Unfilled *Orders
1946			
TOTAL	752,028	452,355	.....
1947			
July	64,162	40,733	234,656
Aug.	62,404	38,165	229,735
Sept.	71,568	40,138	218,276
Oct.	83,979	47,673	210,695
Nov.	72,111	39,969	206,510
Dec.	77,757	44,042	202,408
TOTAL	895,054	513,228	.....
1948			
Jan.	77,744	45,808	205,759
Feb.	75,194	42,582	209,447
Mar.	86,767	50,017	203,351
Apr.	80,602	45,941	199,578
May	76,079	42,261	191,553
June	81,747	48,113	178,760
July	64,995	34,940	180,421
Aug.	73,273	41,088	176,824
Sept.	77,824	43,881	164,002
Oct.	81,761	44,305	158,351
Nov.	77,234	42,241	146,422

* For sale only.

Aluminum Castings

(Thousands of pounds)

	Shipments Total	Shipments Sand	Shipments Perm. Mold	Unfilled *Orders
1946				
TOTAL	388,711	160,845	153,138	.....
1947				
July	30,197	10,095	11,739	101,370
Aug.	30,441	10,908	11,342	94,658
Sept.	35,877	12,228	14,146	94,637
Oct.	40,532	13,855	15,685	85,012
Nov.	34,683	11,428	13,558	83,975
Dec.	37,489	12,552	13,784	81,784
TOTAL	441,996	155,112	174,515	.....
1948				
Jan.	37,889	12,670	15,020	86,176
Feb.	37,963	12,177	15,055	88,032
Mar.	41,794	13,343	16,258	78,344
Apr.	38,269	12,407	14,563	78,499
May	33,868	11,854	12,351	75,219
June	35,822	12,296	13,239	72,930
July	28,944	9,851	10,504	70,321
Aug.	32,136	9,883	13,174	68,334
Sept.	35,877	11,822	13,353	66,773
Oct.	35,542	11,733	13,216	65,538
Nov.	34,550	11,410	13,012	63,767

* For sale only.

Copper-base Alloy Castings

(Thousands of pounds)

	Shipments Total	Shipments Sand	Shipments Perm. Mold	Unfilled *Orders
1946				
TOTAL	898,952	832,037	26,520	.....
1947†				
July	70,603	64,686	3,284	70,002
Aug.	75,060	68,271	4,021	68,659
Sept.	83,158	75,728	3,976	69,919
Oct.	92,119	83,592	4,763	67,280
Nov.	81,803	74,274	3,773	73,851
Dec.	87,215	79,495	4,393	74,814
TOTAL	1,051,742	960,732	51,139	.....
1948†				
Jan.	85,432	77,433	4,593	74,579
Feb.	87,169	79,329	4,509	71,143
Mar.	96,344	87,249	5,261	70,544
Apr.	89,035	80,426	4,705	70,726
May	81,286	72,982	4,910	65,818
June	84,817	76,241	5,148	64,149
July	71,803	64,389	4,670	66,014
Aug.	81,976	73,947	5,018	69,126
Sept.	86,973	78,830	4,999	66,574
Oct.	91,311	82,463	5,293	62,571
Nov.	86,497	77,751	5,107	60,892

* For sale only.

† 1947 and 1948 figures include copper and copper-base alloy castings.

Magnesium Castings

(Thousands of pounds)

	Shipments Total	Shipments Sand	Shipments Perm. Mold	Unfilled *Orders
1946				
TOTAL	8,472	7,149	532	....
1947				
July	492	372	67	2,772
Aug.	523	382	83	3,267
Sept.	518	421	56	2,747
Oct.	616	557	21	2,659
Nov.	602	540	31	2,808
Dec.	669	586	39	2,730
TOTAL	7,693	6,404	729	....
1948				
Jan.	659	592	...	2,701
Feb.	655	566	...	2,866
Mar.	704	645	...	2,741
Apr.	673	588	...	2,640
May	622	540	38	2,673
June	709	666	4	2,712
July	554	...	...	2,684
Aug.	703	...	...	2,834
Sept.	745	...	...	3,206
Oct.	708	...	...	3,070
Nov.	728	...	...	3,416

* For sale only.

WHY RIDDLE YOUR ? SAND BY HAND?

RIDDLING sand by hand is a familiar, but unnecessarily hard, way to do the job. No molder needs to continue this back-breaking routine that is just one more way to wear himself out by the end of the day.

Model Illustrated Standard Single Channel $365.00

Standard Double Channel $385

THE Roller Riddle, a new product with years of research behind it, in a matter of seconds riddles sand onto the entire surface of the Pattern plate easily and evenly. A special designed 1/4 h.p. motor, combined with a limit switch, automatically activates the riddle basket, oscillating 900 times per minute.

There is no sand wasted and the 31" travel of the riddle on the channel makes the machine highly flexible. Sealed roller bearings throughout. No lubrication necessary. Shaft is covered with tube rubber eliminating the possibility of sand or dirt in the motor.

The Roller Riddle, with a sand capacity of 65 pounds, is not an experiment, but a reality. Machines have been in round-the-clock operation without mechanical failure for over 3,000 hours. Send for our new catalog.

Send For New Descriptive Literature

ROLLER RIDDLE CORP.

POST OFFICE BOX 178

PORT HURON, MICHIGAN

THE ADVENTURES OF Bill

By PAT DWYER

Drawings by RICHEY

THEY tell me," said Bill, "that some time along in early December, your company threw an elaborate hotel party, distributed valuable gifts, sang 'Happy birthday to you' and all that kind of stuff to mark the occasion of your 30-years' connection with the payroll. I hope you co-operated in a modest and becoming manner. For the benefit especially of the younger members in the party, I trust you handed out valuable gobs of information on how to stick around for 30 years. If you cut it reasonably short and omit the gestures, I might be tempted to listen."

"Your approach is good," I admitted, "and your stance is passable, but—as usual—you are hitting slightly at random. I was not alone. Four other candidates were present to accompany me across the burning sands and so forth. Since you persistently insist, and definitely refuse to take 'No' for an answer, I shall read you a fairly accurate copy of my carefully rehearsed, impromptu remarks:

It is hardly necessary for me to say that I highly appreciate this gracious, generous and unanimous gift on the part of the management—it *was* unanimous, wasn't it?

I also appreciate the kindly spirit which prompted so many of you to attend this function. Possibly the prospect of a free lunch may have been a factor. Also there is a bare possibility that the delightful prospect of watching me and my colleagues being put through the wringer of a public address, may have been, well, if not the chief, at least one of the main attractions.

Thirty years ago I had the pleasure of joining the editorial staff of the Penton Publishing Co. That was before many of you boys and girls were born. So far as I know there is no connection between these two important events. Any resemblance—as the movie people say in their fearful, borrowed and limited vocabulary—everything is either swell or lousy—well, anyway, any resemblance is purely accidental and coincidental—whatever that means!

One of my able sons-in-law claims that when I brought my family here, they were in their bare feet, and spoke some kind of blubbery Esquimaux dialect. This, of course, is a gross exaggeration. The baby, four months old, was barefoot most of the time, but even she had shoes. One of my favorite daughters who has done me the honor of accompanying me to this affair, is sufficient answer. You will note she is quite a la mode from the feather on her hat, to the dainty shoes from the Stone Shoe Co., 840 Euclid Ave. All right. All right. Cross that out. She buys her own shoes. I can remember when I had to buy shoes for the entire family. I honestly believe if all the shoes that I had to buy when the family was growing up, were laid end to end and four abreast, the display would extend from Fire Island Light to the Golden Gate.

As your chairman in his usual happy manner already has informed you, I had considerable trouble in crossing the well known border line between Canada and the United States. The immigration officials did not claim I was a dangerous or otherwise undesirable character. They did not lay any charge of moral turpitude against me. They did not have to; they calmly turned up chapter 13, section A and subsection A 1 of the Alien Labor Law, and simply told me I was out of luck. I could not come in. One old bottle-nose wreck with voice and mannerisms to match those of Finnegan in Duffy's Tavern, went out of his way to show me a sign he flashed now and again. This sign carried a message in about a dozen different languages. They all meant the same "Keep Out. This Means You." It is a great pity the late Bro. Macauley—T. Babington that is—never tried to pass through St. John. He could have tacked another verse or two on the way Horatius held the bridge in the brave days of old.

To the best of my knowledge, the Canadian government did not raise any objection or file any protest when and if they learned I was about to leave the country. All this, mind you, not six months after I had cast a vote in their favor. No sense of appreciation or gratitude—or of grief at my proposed departure.

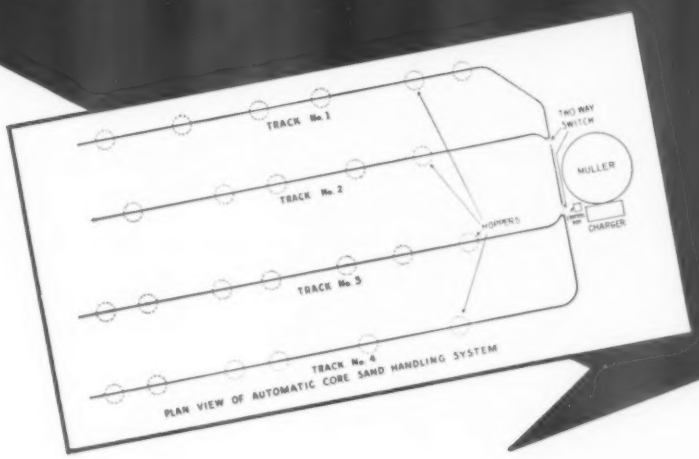
It took the combined effort of the Penton Publishing Co. officials, offi-

(*Continued on page* 204)

Friends, Romans and Countrymen lend their ears on the occasion of the Thirty Year Anniversary

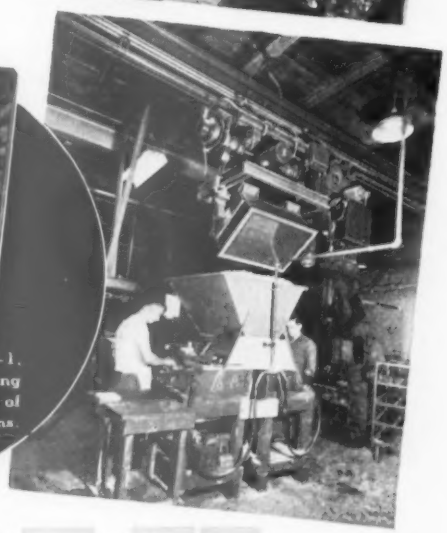
Automatic Dispatch System

delivers 25 tons of core sand per day!



This compact system requires only two men to keep 24 core benches supplied with fresh core sand. Charger receives sand from underground conveyor. Sand is loaded and automatically dispatched and dumped to any one of 24 stations, on four tracks, by push button control. Track switches are manually operated. Each track can be increased to 16 stations or 64 in all. This is another of the hundreds of American MonoRail installations that have cut handling costs. Let an American MonoRail engineer show you how it can be done in your business.

SEND FOR BULLETIN C-1, a 56-page book showing successful applications of American MonoRail Systems.



THE AMERICAN MONORAIL COMPANY

13104 ATHENS AVENUE **CLEVELAND 7, OHIO**

Here's Why we always use CERTIFIED ABRASIVES

They're More Economical . . .

That's right, Certified Samson Shot and Angular Grit are more economical because each grain is a solid homogeneous mass that wears away slowly, lasts longer for top-efficiency blast cleaning at lowest cost.

They're Extra Tough . . .

Extra toughness gives you faster, better cleaning besides longer wear. Certified's special automatically controlled hardening process gives them this toughness. We use 'em over and over again!

So take a tip from me, specify Certified Abrasives for faster, better, cheaper, safer blast cleaning.

All sizes graded to S. A. E. specifications

PITTSBURGH CRUSHED STEEL CO.
PITTSBURGH, PENNA.

STEEL SHOT AND GRIT CO.
BOSTON, MASS.

(*Continued from page* 202)

cials of the International Molders' Union in Cincinnati where I held an honorary card, and of the late William B. Wilson, at that time secretary of labor, to take down the barriers and let me in.

I see half a dozen embryo editors ready to take the floor and condescendingly point out to me that I am all wet. They will claim that Mr. Wilson was sitting in the president's high chair out on the back porch at this period. Just another example of where a little knowledge is a dangerous thing. As a matter of fact, the place was full of Wilsons. Woodrow in the high chair, William B. secretary of labor, and James secretary of agriculture. Like the boys in the Whippenpoof song, they are all forgotten like the rest, but they all flourished together in Washington.

Incidentally, and as a direct result of the foregoing international affair, the Alien Labor Law was amended a short time later to include journalists in the group formerly exempt. Journalists now are classified with actors, clergymen and Indians.

Shortly after I came here the late Mr. Backert was invited to speak at a meeting sponsored by the board of trade, or the chamber of commerce or something in Ellwood City. He very kindly asked me to go with him. When the Boss asks you to go, why you had better go.

Some of you older members will remember the Chief and how his charming, magnetic and dynamic personality illuminated everything he said. He was equally skilled in all three branches of the English language: Plain, ordinary English; cultured and classical English for formal occasions; and foundry English as she is spoken occasionally under stress of deep emotion. He also had picked up some foreign expressions.

He could discuss the most prosaic subjects, the price of pig iron—some of the older members can remember when this material was available everywhere for less than $20 a ton; specification for steel scrap or any other material, or the probable effect of a change in the tariff on bull hides from Montevideo in Uruguay, or from Buenos Aires on the river Plate in Argentina—and hold his hearers' attention as closely as the radio announcer covering a tie game at the stadium, with the Indians at bat in the ninth inning, with the bases loaded and with the local Casey all set to wham the next one on the nose and knock it to hellangone over the bleachers. In a word, if you get

(*Continued on page* 206)

SOFFEL'S
THERMOTOMIC *

(Patents Pending)

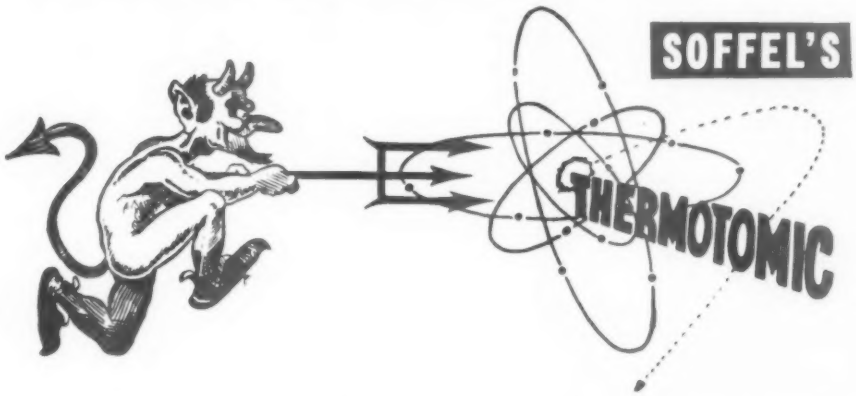
exothermic metal feeding compound

✓ Cuts casting costs

✓ Makes better castings

FOR STEEL, STAINLESS STEEL, GRAY OR MALLEABLE IRONS, COPPER, BRASS AND BRONZE

Better castings, more economically produced, result from the use of Soffel's Thermotomic—the exothermic metal feeding compound which keeps feeding metal molten longer. Here specifically are the benefits you get from Thermotomic:



Reduces sizes of Riser and Feeder Heads

Heads and Risers Removed Without Cutting and Burning

Increases Yield

Eliminates Shrinkage and Piping in Castings

What Thermotomic Is

Thermotomic Compound is an exothermic material which can be molded and baked into any desired shapes just as sand cores are made. It produces a temperature of 3500° F. It is used as ring inserts under the risers or feeding heads, or as facing inserts where it is desirable to maintain the fluidity of metal in the mold at those points where rapid cooling may cause piping, shrinkage, or segregation. Great savings are realized through reduced riser dimensions and cleaning costs.

Thermotomic for All Metals and Alloys

The widely different characteristics of metals used in castings require that Thermotomic be available with characteristics which will suit specific metals. Here are the types of Thermotomic and their uses:

Standard Thermotomic:
For use in dry sand molds with steel, stainless metals, gray or malleable iron, copper, brass and bronze.

Thermotomic X-235:
Has a double exothermic reaction; that is, after having burned through once, the terrific heat developed serves to set off another chain of chemical reactions within the material causing it to burn again with the development of even greater heat than that produced by the first burning. Recommended when it is desired to maintain temperature of the feeding metal for an unusually long period of time.

Thermotomic WP
(Waterproofed): For use in green sand molds with any of the above non-ferrous metals. Cores or inserts made of Thermotomic WP may be left in green sand for several hours or overnight without absorbing moisture from the mold. May also be used in dry sand molds.

Thermotomic ABC:
Aluminum and magnesium may be adequately fed through feeding heads or risers with ABC Thermotomic ring cores placed under feeding heads and ALX-31 Liquidizer on surface of feeding metal in the heads or risers. Thus a reservoir of molten feeding metal will be maintained for a period of 30 minutes or longer. Chills can be eliminated in molds by keeping feeding metal liquid longer than the casting.

Soffel's Carbon-Free Liquidizer Is Recommended for Best Results

Best results and maximum feeding can be obtained from Thermotomic when Soffel's No. 5 Liquidizer is used in conjunction with it. This liquidizer, when applied on the surface of the feeding metal in all heads and risers, enters into an exothermic reaction which serves to heat the upper portion of the metal while Thermotomic heats the core of the metal. No. 5 Liquidizer also provides an insulating cover which further delays cooling. Other types of Soffel's Liquidizers are available for conventional feeding heads and ingots. *Note:* With Thermotomic ABC, use Soffel's AL-X31 Liquidizer.

"Beware of Imitations"

* Patent Pending.

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A money-making investment. Saves time . . . . saves manpower . . . . saves sand. Priced FOB Leavenworth.

TYPE CS—$290.

This model designed for automatic discharge of gaggers, refuse, etc. Comes completely equipped.

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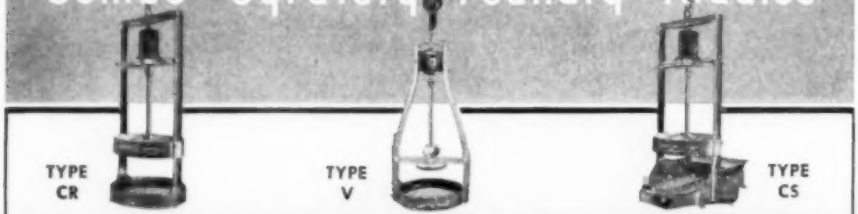

GREAT WESTERN MANUFACTURING CO.
LEAVENWORTH, KANSAS, U. S. A.

(*Continued from page* 204)

what I mean, he was good.

When he was through on this occasion, or for that matter on any occasion, there was nothing more to be said. I confined what few remarks I had to make to a more or less facetious reference to boards of trade, chambers of commerce, luncheon clubs and other more or less useless and ornamental organizations. In their insatiable lust for fresh speakers, and their lack of interest in nearly every subject, in their lumping together of amateurs and professionals, they practically have ruined oratory as a fine art.

On the way back to town that night, naturally we discussed some of the events and incidents of the meeting. I asked the Chief, what he thought of my maiden effort.

"Well Pat," he said, "I'll tell you. Your line of chatter was mildly entertaining, but in the future—that is if we go out together again—in the future for the luvagod try to mix a little meat amongst the garbage. These birds want something to chew on."

"A very good piece of advice indeed, which I am afraid you always have not lived up to," said Bill. "Seems to me at one time I heard of a famous Frenchman with the same idea. He put it in a different way, but it amounts to the same thing. 'When you have nothing to say,' says this foxy lad, 'say it!'

"However," Bill continued," occasions arise now and again, where you have to come out of your shell. For example, I had a letter the other day from a foundryman in India. He had a job that had him puzzled. He wrote that he would appreciate information on the best method for molding and pouring light, cast iron dobby jacks for textile machinery. These castings are about ¼ to 3/16-in. thick; 1¼-in. wide and 5 ft in length with two elbow bends at the center. What is the most suitable analysis of the iron? Is annealing required to prevent deformation? He also would appreciate information on the proper sand mixture for mass production, the proper pouring temperature for the iron,, and any other features worth mentioning. I replied to him as follows:"

These castings can be molded according to any one of several methods. Decision on which method is most advantageous in this particular case depends to a considerable extent on the number required per day; the style of patterns; whether new flasks are required or the necessity

(*Concluded on page* 210)

DEMMLER

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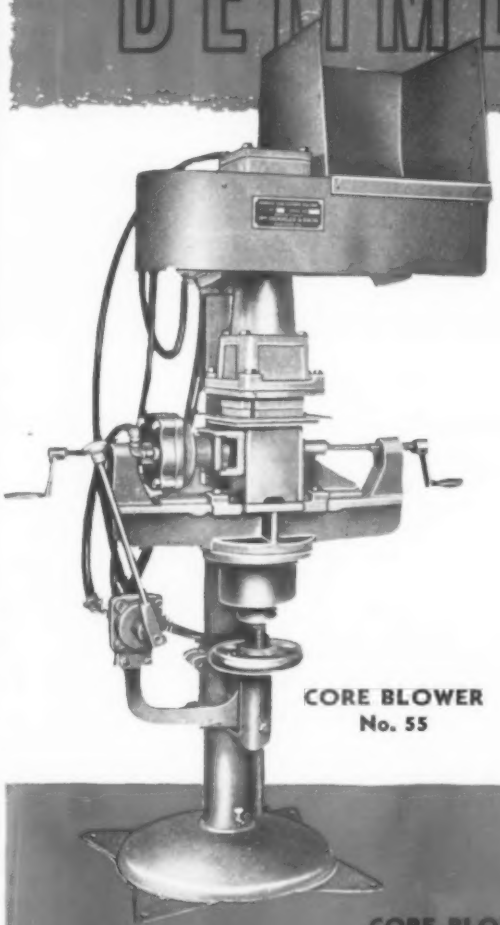


CORE BLOWER
No. 55

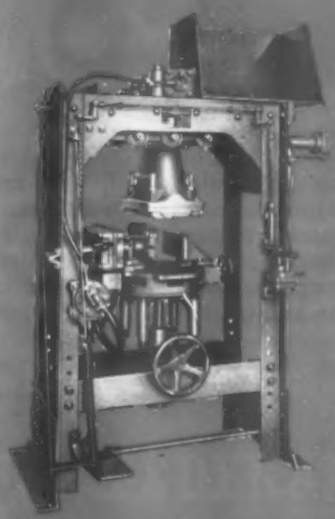
DEMMLER CORE BLOWING MACHINES

High production . . . maximum economy!

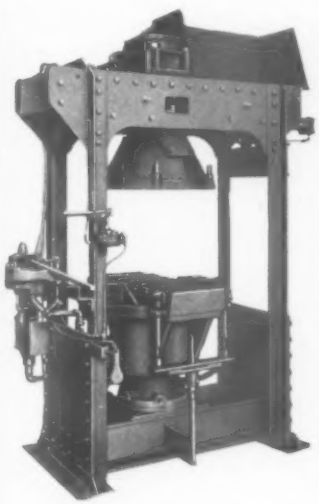
Every foundryman realizes the absolute necessity for both in these days of ever increasing production costs, and that's where DEMMLER Core Blowing Machines fit into your picture! DEMMLER machines are dependable, rugged, versatile, producing economically day after day — year after year.

At the left is the popular DEMMLER No. 55, a small core blower unequaled for blowing cores up to four pounds. Will accommodate boxes 9" long. Sand magazine and carriage are aluminum castings, mounted on ball bearing rollers for easy pushing from filling to blowing position. Machine has both vertical and horizontal air operated core box clamps, controlled automatically by the same valve that blows the core. Ideal for short run jobs. Simple in construction . . . simple in operation, the DEMMLER No. 55 has earned the praise of foundrymen everywhere.

CORE BLOWER No. 1



Well known and liked by foundrymen is the DEMMLER No. 1, at left. This is a general purpose machine for blowing cores weighing up to eight pounds, such as plumbing goods, electrical fittings up to 1½", and various small brass, malleable and grey iron castings. The No. 1 possesses quick job changing features. Chuck table is raised and lowered by a hand wheel. Chuck jaws are easily adjusted for different core box widths. Will blow either horizontal or vertical. Different size sand magazines available. Capacity: approx. 200 core boxes per hour. Many have been in continuous, profitable use for more than 25 years with only minor repairs!



CORE BLOWER No. 3E

The DEMMLER No. 3E core blower, at left, has gained an enviable reputation as a highly efficient machine for use on large cores which can be blown to advantage by attaching the top half of the core box to the blow plate and drawing the core on the machine.

An important feature of this machine is that the table height is adjustable by means of the large nut on the base, so that only as much draw is used as required.

The No. 3E is outstanding for automobile work and similar castings. The cylinder has a long center guide stem which slides in a sleeve, to insure a draw of extreme accuracy. Two hand valves operate the machine — one moves the carriage from filling to blowing position, the other raises the table, blows and draws the core. Time cycle is about 12 seconds.

Draw cylinder is 17 inches in diameter, has 10 inch stroke. Will blow cores weighing up to 35 lbs. Here is a large capacity, high production core blower with draw cylinder feature that is unexcelled in its field.

There is a DEMMLER Core Blower to meet every requirement. Let us help you with your particular needs. Illustrated specification sheets on any of the three Core Blowers will be sent upon request.

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FEDERAL'S LOWE SIFTER

Save money by faster sifting, better sand conditioning with a Lowe Electric Sifter. Features: greater screening area, enclosed ball bearing motor, more shoveling room. Write for information. Prompt delivery.

CLIMAX WIRE STRAIGHTENERS

Any foundry, large or small, can cut production costs by straightening and reusing core wires and rods. With a Climax Wire Straightener this can be done quickly, economically, safely — by unskilled labor. A complete descriptive circular is yours for the asking.

The "Lightning" Clamp

The "Holdtite" Clamp

CLAMPS

Federal offers two types of flask clamps.

The "Lightning" clamp is an eccentric type, requiring no wedges and available in two sizes: No. 2, 8" to 12" and No. 3, 12" to 20".

The "Holdtite" is an adjustable clamp designed for use with wedges and is also offered in two sizes: No. 1, 13" to 23" and No. 0, 18" to 33".

Both clamps made of sturdy malleable iron, rigidly reinforced to prevent distortion.

FEDERAL'S WONDER CUTTERS

Two compact cutters for rods and band iron. One cuts up to ⅝" round and the other to ⅞" round. Readily mounted on any bench. Users say they're worth their weight in gold!

RUBBER-COVERED SHOVEL HANDLES

The best insurance you can buy against damaged patterns, core boxes or flasks. The pean-shaped grip is ideal for ramming.

They will fit your present shovels or you can order your next shovels with them already installed.

TWISTED STEM CHAPLETS

The chaplet with everything. The "Twisted Stem" promotes rapid complete fusion. Not deformed, the stem has no weak spot to burn in and permit core shift. Made in a complete range of sizes. Samples of the size you use, gladly submitted.

WATER BRUSH

Easy to Grip and Hard to Tip. It can't leak and one filling lasts all day. Does not tire the molder's hand.

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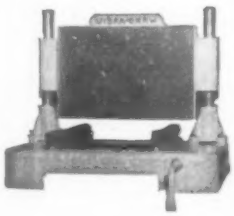
Air operated, fool-proof jolt machines that ensure uniform cores. Sturdy cast iron construction with no external valves to wear out. Made in four sizes. Get our prices and deliveries.

SHUR-SPOT SPRUE

Designed for use on squeezer-made molds, Shur-Spot squeezes right down with the sand. When the squeezer board is removed, the Shur-Spot pops up and can be lifted right out. The result is a fully completed and properly located pouring sprue that requires no finishing. Shur-Spot Sprue eliminates danger of falling sand.

For complete information on the Shur-Spot Sprue, write for the circular on this low-priced easy-to-use item.



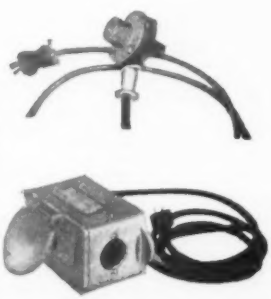
FEDERAL'S "VIBRA-DRAW" CORE DRAWING MACHINE

Cuts costs in your core room by making it easy for every core maker to draw perfect cores as fast as he can fill the core box, place it against the vibrating head and lift the box. Made in two styles: the floor model and the portable bench model shown here. Immediate delivery — write for details.

FEDERAL VIBRATOR No. 2 and 5

Federal's own make and available for immediate delivery. Hard-chromed piston guarantees long life. For 110 volt, 60 cycle, single phase operation. $15.60 each, f.o.b. Cleveland; No. 5 for heavier duty—$20.40 each.

Federal also has a new "convenience outlet knee switch." No taping, soldering or wiring. Plug in—that's all. Carried in stock. $7.50 each, f.o.b. Cleveland, Ohio.



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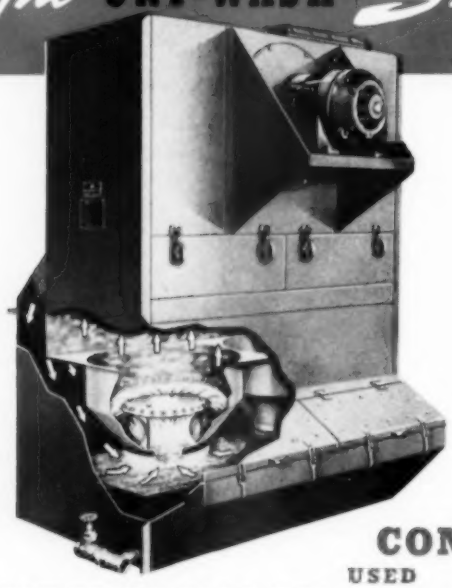

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Uni-Wash "Senior" Dust Collectors have been successfully used to combat dust conditions in almost every industry. They may be used individually or in combination . . . for heavy duty dust collection locally or as part of a complete plant system.

Dust is drawn into the unit, either vertically or horizontally, and water-washed in the patented Uni-Wash system. The water is then separated out from the air and the clean air is discharged or re-circulated through built-in exhaust fan. Water is continuously re-circulated by the exhaust fan suction, thus eliminating pumps, spray nozzles, etc. All standard units maintain static inlet pressure of 5" water gauge. Automatic sludge removal can also be provided.

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(*Concluded from page* 206)

of using existing flasks; crane equipment for handling small, but not large flasks. Number of patterns may vary from one to six. In a case of this kind the patterns may be mounted on both sides of a board or plate for use either on the floor or on a machine. Wood patterns will serve for limited production. For prolonged runs it will be necessary to provide metal patterns of iron, brass or aluminum. The patterns may be attached to the plate with small bolts or preferably cast as part of the plate. That is a detail to be settled by the foundry and pattern shop superintendents. It is not a major factor since either style of pattern will produce satisfactory castings.

The style of gating will depend on the number of patterns in a flask, also on the usual temperature of the iron. In an ideal setup six patterns are used. Molds are gated at both ends, and poured with metal in the 2700° F range. A single sprue in the center near each end of the cope delivers metal to a long runner in the cope. This runner in turn feeds the gates leading to the mold cavities. A short time after the castings have been poured, sand is cleared away from around the sprues to permit normal contraction. Alternatively, the operator may strike the top of the sprue sharply with a hammer and thus break connection between gates and casting.

No necessity exists for annealing the castings. Care must be observed in shaking them out. If one side remains in contact with the sand while the other side is exposed to the atmosphere, the casting will warp. The hot castings are shaken out and placed on edge on suitable supports, where the air can circulate, and where the castings can cool uniformly. Probably this is the most important factor in the sequence of operation.

With light thin castings, the sand service is not severe. Practically any kind of molding sand may be used. Sand at present in the foundry for general casting purpose will make satisfactory molds for the dobby jacks. If the necessary equipment for testing the sand according to American Foundrymen's Society standards is available, a suitable sand for the purpose will conform as follows: Fineness 100; clay content 15 per cent; permeability 40; green bond tensile 4 to 9 oz.; green bond compression 3 to 8 lb. Suitable iron composition will show: Total carbon 3.25 per cent; silicon 2.50 per cent; manganese 0.60 per cent; phosphorus 0.30 per cent.

*High Sipi I.Q.**

protects the quality of your castings . . .

To begin with . . . you work with high **Ingot Quality* when you use SIPI ALLOYS. Through strict laboratory control, the correct casting qualities are assured for each type of job. This means fewer rejected castings . . . with a consequent saving in man-hours, machine-time, and materials. Our metallurgists will be glad to cooperate with you on your specific applications.

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ACTIVITIES OF FOUNDRY Groups

Pittsburgh

METAL melting procedures were discussed at the Jan. 17 meeting of Pittsburgh Foundrymen's Association. Three papers were presented as follows:

"Factors Influencing Slag Fluidity as a Control Guide for Acid Open Hearth Heats," by James W. Linhart, metallurgist, Pittsburgh Rolls Division, Blaw-Knox Co.; "Acid Electric Melting Practice for Low Carbon Steel Castings," by I. W. Sharp, chief metallurgist, American Steel Foundries, Verona, Pa.; and "Acid Practice for Melting Stainless and Heat Resisting Alloys," by R. H. English, metallurgist, National Alloy Steel Division, Blaw-Knox Co.

Mr. Linhart pointed out that the slag fluidity test was shown to be a practical guide in the control of Grade B casting heats made in an acid open hearth. The fluidity test was used in the measurement of metal temperature, time and amount of ore additions and efficiency of alloy additions. Further study disclosed that these control features of the slag fluidity test were affected by the charge materials and the furnace atmosphere in the acid open hearth heats.

Mr. Sharp stated that care must be exercised in the selection of scrap because phosphorus and sulphur are not reduced in the process he described. Four major variations of the acid electric melting practice are: Partial oxidation, complete oxidation, complete oxidation and silicon reduction, and double slag practice.

The complete oxidation practice is most widely used. In this practice a vigorous boil is developed and residual silicon and manganese are reduced to low amounts. A number of different combinations and sequences of alloy additions are employed for preliminary deoxidation. Some recent work shows better results obtained by adding silicon and manganese together 10 to 15 minutes before tapping, with the remainder 2 minutes before tap.

Special deoxidizers are usually added to the ladle. Aluminum in amounts of 2 to 4 lb per ton is generally used. Other special deoxidizers also may be used with aluminum. Considerable work is being done to develop practices in which aluminum is not used.

Mr. English remarked that the larger tonnage of high alloy castings is made in the following four grades: 18 chromium, 8 nickel; 25 chromium, 12 nickel; 25 chromium, 20 nickel; and 15 chromium, 35 nickel. It has been determined that the slags in equilibrium with these alloys in an acid-lined arc furnace contain chromium oxide as the (Mn O) (Cr_2 O_3) spinal, the chromium content of which is roughly equal to the chromium content of the metal. Free Cr_2O_3 always forms during melting but is readily reduced by the addition of manganese and silicon.

Experiments show that these alloys dissolve hydrogen alone by simple solution, and that these slags are remarkably resistant to the diffusion of hydrogen, thus offering excellent resistance to gas absorption from the atmosphere during the melting process.

Saginaw Valley

SAGINAW Valley Chapter of the AFS met at the Fischer Hotel, Frankenmuth, Mich., Jan. 6. Men from General Foundry and Buick Motor Division foundry were the honored guests, and they were introduced formally at the meeting.

Clyde A. Sanders, vice president, American Colloid Co., Chicago, spoke

(*Continued on page* 214)

SAGINAW VALLEY Chapter of the AFS at its Jan. 6 meeting at Fischer Hotel, Frankenmuth, Mich., had as honored guests, men from General Foundry and Buick Motor Car foundry. Principal speaker at the meeting (right) was Clyde A. Sanders, American Colloid Co., Chicago

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(*Continued from page* 212)

on "Modern Progress in Molding Sand Practice." He was introduced by John F. Smith, technical chairman of the meeting.—*Norman J. Henke, Central Foundry Division, General Motors Corp.*

Michiana

NINETY-FIVE members of the Michiana Chapter of the AFS attended the regular meeting Jan. 6 at Hotel LaSalle, South Bend, Ind. William B. McFerrin, metallurgical engineer, Electro-Metallurgical Sales Co., Detroit, spoke on "Casting Defects."

He stated that because of a change from a seller's to a buyer's market, foundries in general would need to observe production results more carefully and to inaugurate a better control over scrap.

Mr. McFerrin outlined a properly organized approach to the solution of scrap problems. This plan incorporates calling in all concerned with the production of castings, to view all defects with unbiased minds: the analysis of casting defects to be determined whether by failure of management to evaluate properly the type of casting to be produced, failure to provide proper equipment, failure to understand how to produce the casting, failure to have casting designed properly and failure to select men properly for production of casting.

To bring to the attention of this audience various casting defects, the speaker presented a series of illustrated slides and explained in detail casting defects and prescribed possible remedies for their elimination.

Central New York

DINNER meeting of the Central New York Chapter of the AFS was held Jan. 14 at Onondaga Hotel, Syracuse, N. Y. Adam Mahonske, service engineer, Semet-Solvay Division, Allied Chemical & Dye Corp., Buffalo, spoke on "Factors Affecting Cupola Operation and Present Coke Production."

Mr. Mahonske dwelt mainly on the need for careful weighing and measurement of the material making up the charge and also the selection of competent men to handle this important phase of cupola operation.—*J. A. Feola, Crouse Hinds Co.*

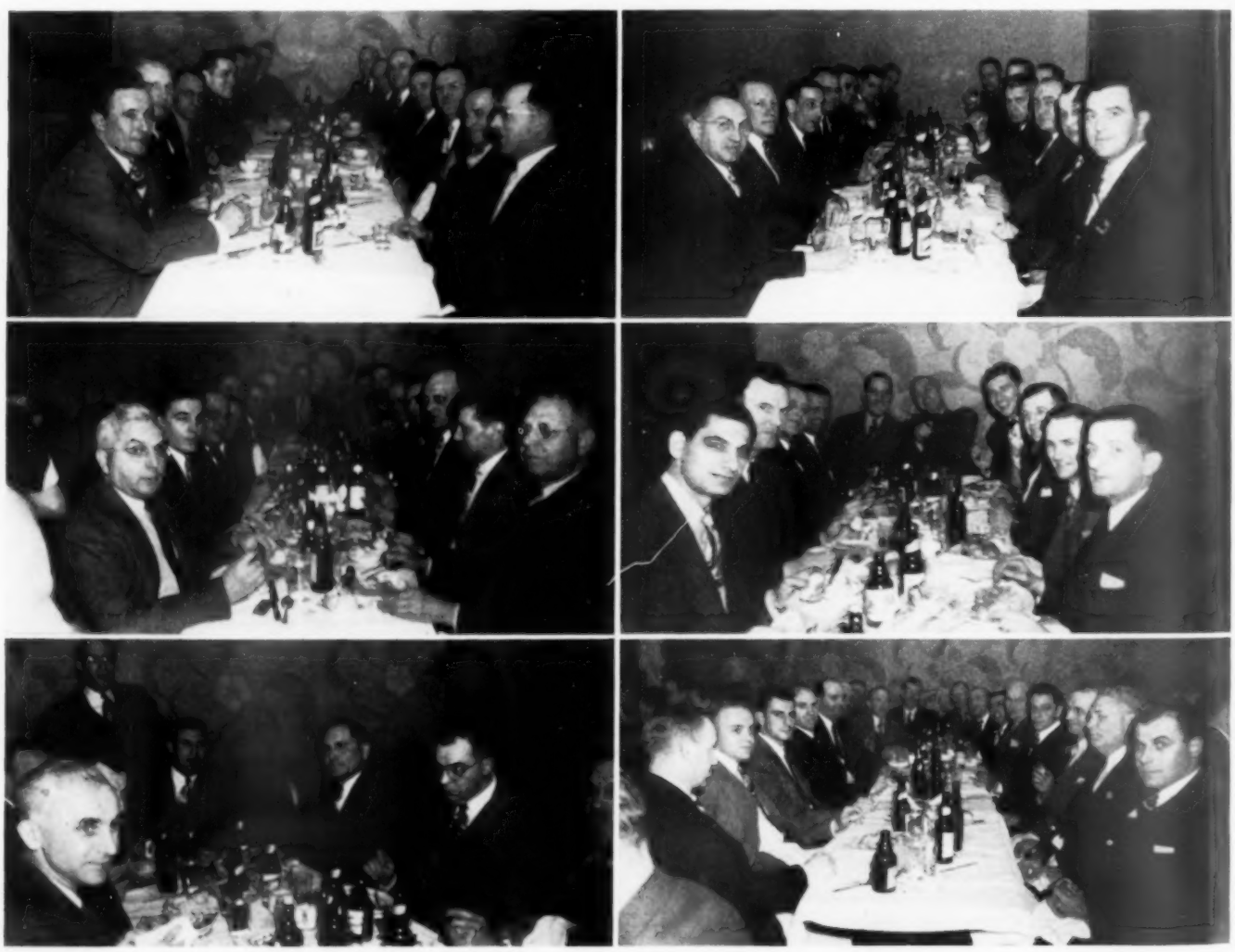
Northwestern Pennsylvania

N. RANSOHOFF, president, N. Ransohoff Inc., Cincinnati, O., was the technical speaker at the regular monthly meeting of Northwestern Pennsylvania Chapter of the AFS held at the Moose Club, Erie, Pa., Jan. 24.

Mr. Ransohoff spoke on "Wet Cleaning of Castings." He emphasized the addition of chemicals to water which impart better rust resisting qualities to castings, superior, in his opinion, to dry cleaning. Clyde E. Cooper, Keystone Brass Works, Erie, Pa., led the discussion.

Dr. Herman C. Grose, superintendent of the Erie school system, gave

(*Continued on page* 216)



NORTHWESTERN PENNSYLVANIA Chapter of the AFS held its annual Christmas party in the Blue Room of the Moose Club, Erie, Pa., Dec. 17

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MAGNESIUM FLASKS

ACCURATE-LIGHT-STURDY

All Orders Given Very Prompt Attention

FREMONT CAST IRON JACKETS

BUILT FOR LONG SERVICE AND FAST PRODUCTION

GROOVLOCK

THE FOOL-PROOF PIN

THE FREMONT FLASK CO.
Fremont, Ohio

(*Continued from page* 214)

the coffee talk. Dr. Grose spoke on vocational training in public schools. He called attention to the need of new schools, especially vocational schools that would train boys better adapted to Erie industry. Joseph A. Shuffstall, National Erie Corp., Erie, led the question and answer period. —*James J. Farina, American Sterilizer Co.*

Metropolitan

ROUNDTABLE discussion on "Foundry Defects and Control" featured the Jan. 3 meeting of Metropolitan Chapter of the AFS at Essex House, Newark, N. J. A. E. Keskulla, Star Aluminum Co., New Market, N. J., led the discussion of defects in the light metal foundry. Comments hinged mainly on problems encountered in the permanent mold aluminum foundry and the various means of overcoming them.

Principal theme of the gray iron discussion group, headed by John Van Haver, Worthington Pump & Machinery Co., Harrison, N. J., was the problem of continuously increasing mechanization and dividing of responsibility in the foundry due to the breaking down of operations and the resultant closer control required by top supervision in order to locate the source of casting defects and thereby reduce them to a minimum.

The malleable iron group, led by L. R. Spann, Eastern Malleable Iron Co., Naugatuck, Conn., discussed the use of oil and plastic core binders and their effect on quality, as well as melting practices and the problems involved in the storage of sand and coal.

Bernard M. Ames of the New York Naval Shipyards, Brooklyn, N. Y., led the discussion of the copper-base alloys group. This group covered a wide range of subjects based on the difficulties encountered in the brass and bronze foundry and various means of overcoming and controlling them.

Numerous x-ray films were displayed by D. W. Talbot, Cooper Alloy Foundry Co., Hillside, N. J., showing defects caused by gas, shrinkage and sand inclusions encountered in the manufacture of alloy steel castings. He explained the problems and the steps that were taken to eliminate them, such as heading, gating, sand mixtures, and others. Herbert Cooper spoke briefly on the progress they were making in the introduction of oxygen to reduce the carbon content in melting stainless steels. —*George Baer, Atlas Foundry Co.*

Northeastern Ohio

FOUR simultaneous sessions devoted to roundtable and panel discussions on the subjects of foundry equipment, casting finishing, casting inspection and patternmaking characterized the Jan. 13 meeting of Northeastern Ohio Chapter of the AFS at Tudor Arms Hotel, Cleveland.

At the foundry equipment session Earl Turner, in the unavoidable absence of Arthur J. Tuscany, executive secretary, Foundry Equipment Manufacturers' Association, spoke on

(*Continued on page* 218)

METROPOLITAN Chapter of the AFS held its annual Christmas party at the Essex House, Newark, N. J., Dec. 10. Photos are by courtesy of John Bing, Metropolitan Refractories Corp.

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as the priests chant sacred verses in the belief that those in attendance will be purified.

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CENTRAL INDIANA Chapter of the AFS had as its guest speaker Jan. 10, William J. MacNeill, national AFS director. At left above are: Richard Bertram, visitor from Cincinnati, O.; L. G. Jessup, Federated Metals Division, American Smelting & Refining Co.; Ray Fickenworth, chapter director, and Robert Langsenkamp, Langsenkamp-Wheeler Brass Works, Indianapolis, and chapter chairman. At right is Mr. MacNeill. Photos courtesy of L. W. & W. K. Mitchell Co., Indianapolis

(*Continued from page* 216)

the subject "What's New in Foundry Equipment." He discussed sand preparation equipment, wet and dry cleaning mills, a new type annealing furnace, and the difference between modern mechanized foundries and older types.

Earl M. Strick, finishing superintendent, Erie Malleable Iron Co., Erie, Pa., led a prolonged discussion on foundry finishing problems. He pointed out that inspection and finishing costs are dictated to a large extent by prior steps in the manufacture of the casting, including the blueprint stage. Gating methods will have an important bearing on the amount of finishing required, and for the same reason fins should be eliminated from the casting whenever possible. Recommended procedure in grinding, shearing, milling, pressing, coining, and hand straightening also were discussed in detail.

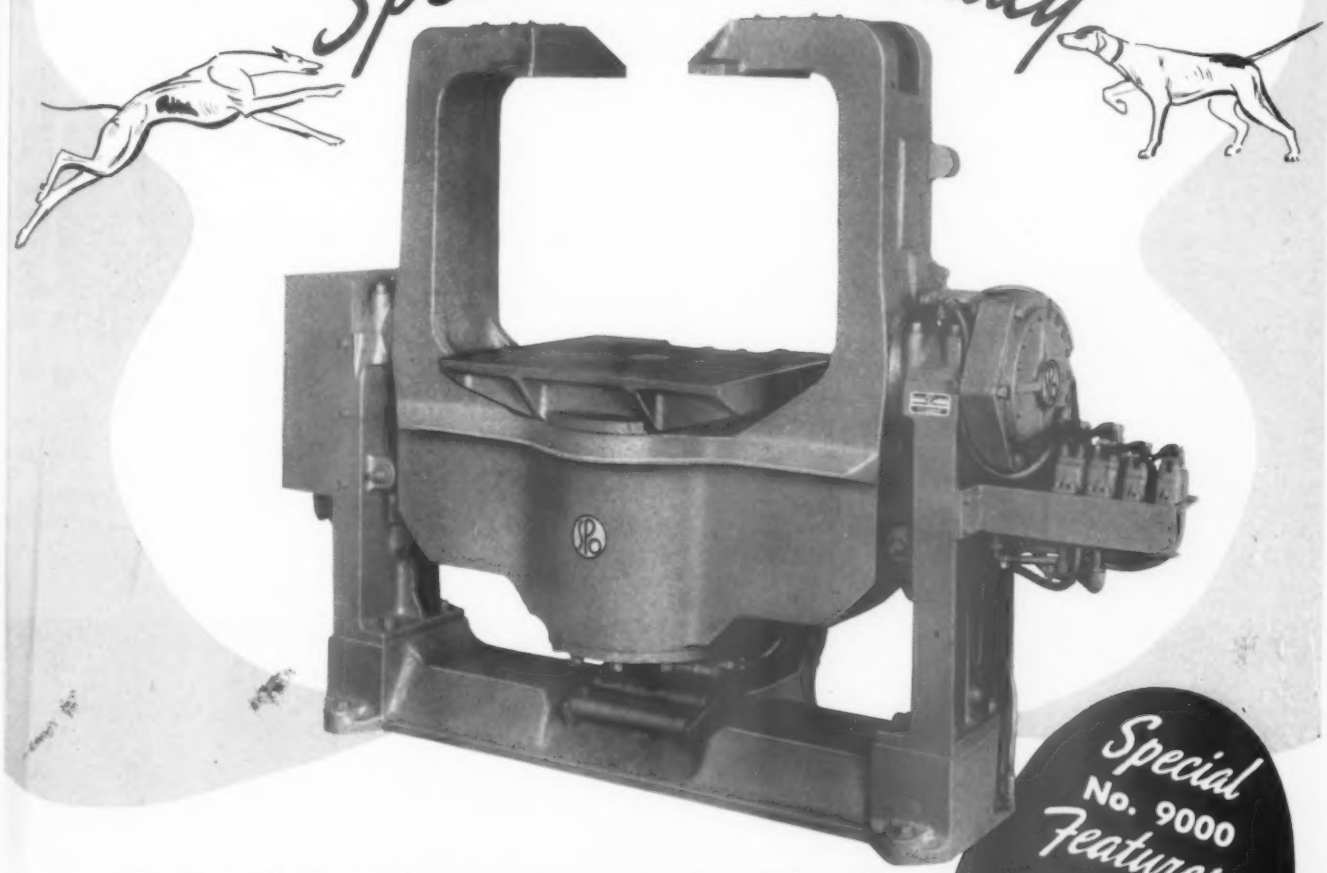
Richard Senz, Permanent Mold Division, Aluminum Co. of America, Cleveland, discussed "Metallurgical Inspection of Castings." He stated that chemical, mechanical and physical property determinations are employed in this type of inspection, and

(*Continued on page* 220)

NEW ENGLAND FOUNDRYMEN'S ASSOCIATION celebrated its 53rd anniversary Jan. 12 at the Parker House, Boston. Photos are courtesy of C. A. Wyatt, Debevoise-Anderson Co., Boston

FOR ENDURANCE AND LONG LIFE BUY SPO MOLDING MACHINES

Because of SPO's INVERTED JOLT FEATURE you can't beat the No. 9000 Series for *Speed-with-Accuracy*



Another SPO molding machine, the No. 9546 Jolt Squeeze Roll-over Draw—for making drag molds. It, too, shows in a practical, cash-register way what SPO's exclusive inverted jolt feature will do for your production. Plenty of speed, giving accurate molds, easy to learn and operate, built to defy use and abuse. We'll be glad to tell you how the SPO No. 9000 Series will benefit you. Always find out first what SPO has to offer.

Special No. 9000 Features...

- POWER ROLL-OVER
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Manufacturers and Specialists in Molding Machines, Vibrators and Patterns for Production

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HONOR: Non-Ferrous Founders' Society honored Chester K. Faunt, first president of the society, at a dinner Jan. 14 in the Swedish Engineers Club, Chicago. Mr. Faunt is seated in the center of the group of five persons facing the camera

(*Continued from page* 218)

the tests usually are divided into two classifications, destructive and nondestructive. He discussed specific tests in both these general fields of testing.

Patternmakers held a panel discussion on the subject, "Should Metal Patterns Be Machined or Hand Cleaned?" F. C. Cech, instructor, Cleveland Trade School, Cleveland, was panel chairman. Members of the panel included Ed Glossner, president, Modern Pattern Works; Tom West, superintendent, West Steel Castings Co.; Charles Wilberschied, superintendent, Master Pattern Co., and George Wright, pattern buyer, John Harsch Bronze & Foundry Co., all of Cleveland.

The audience concurred in the general opinion expressed by panel members that machined patterns form the basis for a standard by which castings can be judged. Identical, machined patterns cannot be blamed for defective work. If one foundry can turn out work with a pattern, then another foundry ought to be able to produce acceptable castings with an identical pattern.

At the December meeting of the Patternmaking Group, the following officers were elected for 1949: Chairman, Frank J. Hrabak, East End Pattern Works; vice chairman, Ted Able, Advance Pattern Works; secretary, Harvey Ennis, Associated Industries; recorder, David T. Kindt, Kindt-Collins Co.; program committee chairman, Peter Rettig, Rettig Pattern Co.; program committee secretary, Carl Winkler, Standard Pattern Works, and educational fund committee chairman, Ernest T. Kindt, Kindt-Collins Co., all of Cleveland.

New England

NEW England Foundrymen's Association met at the Engineers Club, Boston, Dec. 8 with about 98 foundrymen present. Principal speaker was A. B. Segur, A. B. Segur & Co., Oak Park, Ill., whose subject was "Motion-Time Analysis."

Mr. Segur stated that by analyzing the motions required for any job, increased production can result, provided intelligent consideration is given to all factors which affect the job. Speed rating by itself is of no value, but, combined with motion analysis, a time can be found for any job which will cause little excess fatigue.—*Walter M. Saunders Jr.*

Central Indiana

APPROXIMATELY 165 members and guests of the Central Indiana Chapter of the AFS attended the Jan. 10 meeting at the Athenaeum, Indianapolis. A "question and

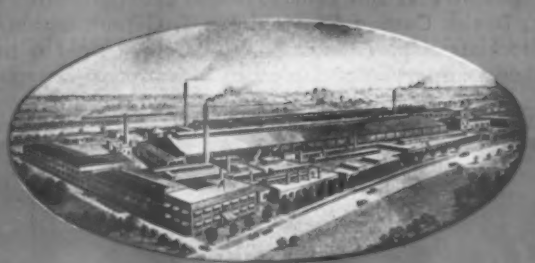
(*Continued on page* 222)

TWIN CITY Chapter of the AFS held its Christmas party at Hotel Radisson, Minneapolis, Dec. 17

More and More Foundries are Using

FANNER DOUBLE HEAD ANCHOR CHAPLETS

Over 100,000,000 Chaplets in Stock



Birdseye view of the Fanner Brookside Park plant in Cleveland

These specially Fanner designed chaplets are rapidly replacing other types of chaplets in foundries the country over . . . BECAUSE THEY ARE EXTRA ADDED INSURANCE OF PRECISION CASTING.

The reason is the extended stem which serves as a definite anchor in holding the chaplet in place, keeps it from being washed away in the molten metal.

If you're using any kind of chaplets, by all means investigate these Fanner Chaplets without delay.

THE FANNER MFG. CO.
CLEVELAND 1, OHIO

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(*Continued from page* 220)

answer" session was featured during which a panel of foundry experts answered questions and discussed foundry problems with members of the audience.

Honor guest at the affair was William J. MacNeill, assistant to the president, Dayton Malleable Iron Co., Dayton, O., and a national director of the AFS. Mr. MacNeill attended as part of the chapter visitation program.

William B. Ziegelmueller, vice president, Electric Steel Castings Co., Speedway City, Ind., presided as technical chairman for the meeting. At a directors' meeting prior to the regular session, Robert Spurgin, foundry superintendent, Swayne, Robinson & Co., Richmond, Ind., was elected a chapter director to fill the unexpired term of Fred Carl, foundry metallurgist, Central Foundry Division, General Motors Corp., Danville, Ill., who retired to join the Central Illinois Chapter.—*William K. Mitchell.*

Birmingham

BIRMINGHAM foundrymen had a most interesting program in January when Ralph Hassett, pattern shop supervisor, Texas Foundries Inc., Lufkin, Tex., discussed "Core Blowing, Venting and Rigging of Core Boxes," at the regular monthly meeting of Birmingham District Chapter of the AFS.

One hundred and thirty-five listened with intense interest as Mr. Hassett explained the development of core blowing equipment and its advantages over bench hand-made cores. He brought a wide variety of blown cores for display and inspection. Many of the cores were used to illustrate points made in his talk.

Seventy-three foundrymen and friends attended the dinner preceding the technical meeting. Dr. J. T. MacKenzie, American Cast Iron Pipe Co., Birmingham, and chapter chairman, introduced Dan Dimick, retired, who told of his experiences as a pioneer foundryman in Birmingham. Mr. Dimick's son, Dan Jr., now owns and operates the Dimick Casting Co., Birmingham, and has just completed

(*Continued on page* 224)

EASTERN NEW YORK: Views of the Christmas party held by Eastern New York Chapter of the AFS. Photos by L. M. Townley, Adirondack Foundries & Steel Inc.

BIRMINGHAM Chapter of the AFS heard Ralph Hassett, pattern shop supervisor, Texas Foundries Inc., Lufkin, Tex., discuss "Core Blowing, Venting and Rigging of Core Boxes" at the January meeting. At left, left to right, are: Ed Hile, Harbison-Walker Refractories Co.; H. W. Gethin, Alabama Clay Products Co., and Fred K Brown, Adams, Rowe & Norman Inc. Bottom left in foreground are: Dan Dimick, retired Birmingham foundryman; Dan Dimick Jr., Dimick Casting Co., and Joe T. Gilbert, assistant to the vice president, Stockham Pipe Fittings Co. At bottom right a group of foundrymen are shown inspecting a display of blown cores brought by Mr. Hassett

TUNGSTEN in various forms and grades has many uses, in metallurgy and other industrial arts. Its uses become still more numerous and more diversified as technical requirements become more exacting. The Molybdenum Corporation offers a comprehensive book on "Tungsten Steel" and will welcome inquiries at any time, on any application of Molybdenum, Tungsten or Boron.

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GRANT BUILDING PITTSBURGH, PA.

MCA

(*Continued from page* 222)

a term as a member of the board of directors of the Birmingham Chapter.—*J. P. McClendon, Stockham Pipe Fittings Co.*

Cincinnati

APPROXIMATELY 100 members and guests attended the Jan. 10 meeting Cincinnati District Chapter of the AFS at the Engineering Society, Cincinnati. W. B. McFerrin, metallurgical engineer, Electro-Metallurgical Sales Co., Detroit, spoke on "Casting Defects."

In listing thirty defects in castings, Mr. McFerrin stated that the correction of such defects wherever possible will determine the success of any foundry. About 15 million tons of castings are poured yearly, and a 1 per cent reduction in scrap will produce an additional 150,000 tons of castings, saving approximately $30 million, according to Mr. McFerrin.

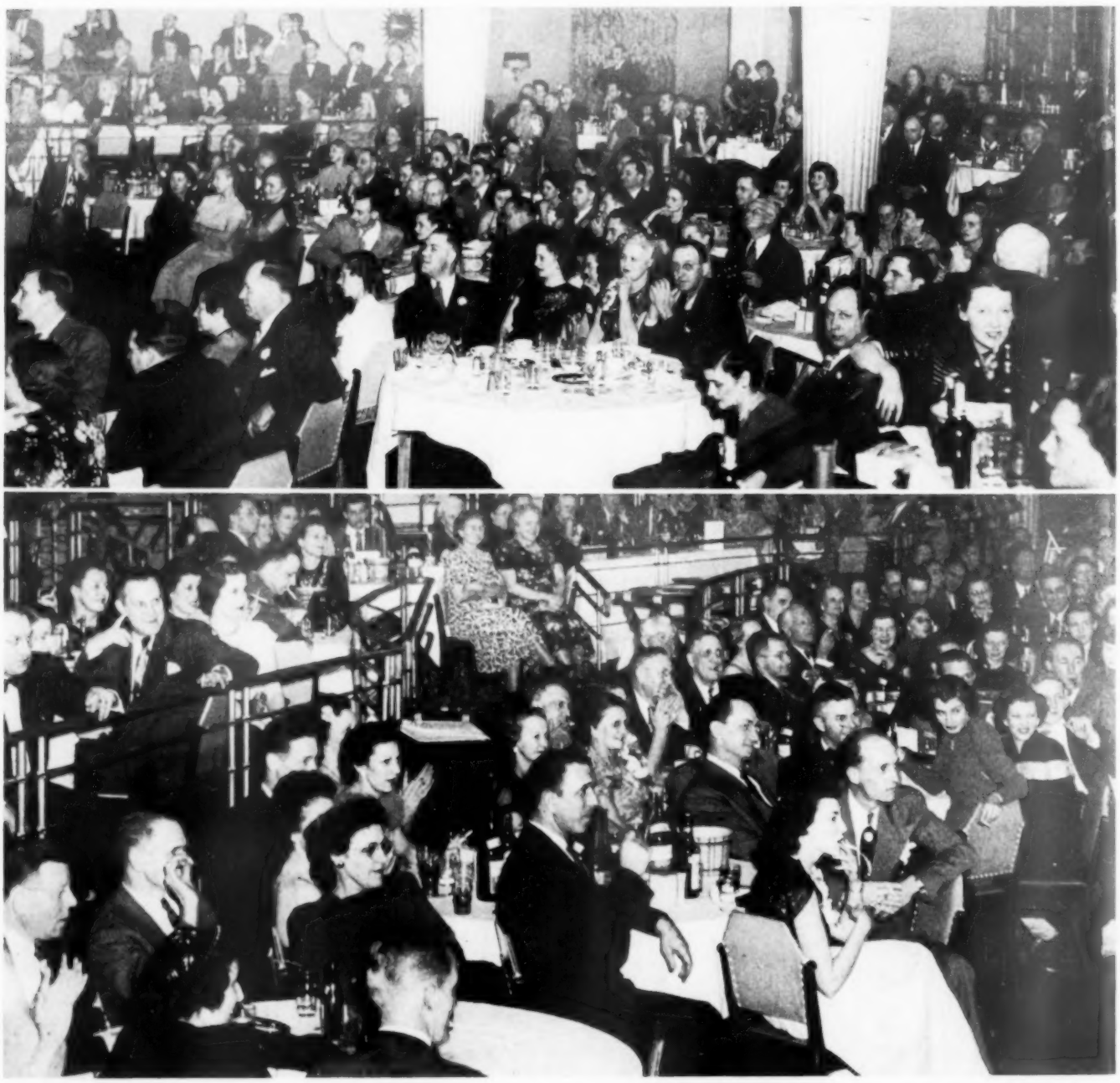
He went on to say that no one man can solve all the problems arising in a foundry and suggested that all people concerned with the making of castings be consulted so that management could consider with an open mind the views of all to remedy the fault. He stressed the necessity for properly evaluating a foundry as to type and size of casting it is equipped to manufacture, and of having trained personnel with the right man on the right job.

A rising vote of thanks was given to Billy Gilbert Jr. and Ed King for their handling of the Christmas party held Dec. 11 at the Netherland Plaza Hotel, Cincinnati. More than 500 members and guests attended the party.—*B. A. Genthe, S. Obermayer Co.*

Twin City

CHARLES B. SCHUREMAN, Baroid Sales Division, National Lead Co., Chicago, delivered an interesting talk to a group of over

(*Continued on page* 226)



CINCINNATI District Chapter of the AFS held its Christmas party at Netherland Plaza Hotel, Cincinnati, Dec. 11, with more than 500 members and guests present

Cut your costs

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MODERN ROLL-OVER MACHINES

AIR JOLT CLAMP
LEVELER ROLL-OVER
PATTERN DRAW

● Save time and increase your output on both jobbing and production work. The adjustable mold conveyor; two reciprocally operating roll-over cylinders; dash pot control and other design and construction features make these machines unsurpassed for both ferrous and non-ferrous plants. Sizes up to 50″ by 60″ tables.

6 OUTSTANDING FEATURES

Assure easy operation Increased production

1. No pit required.
2. Fully air operated.
3. No clamps or wedges for roll-over operation.
4. Mold is clamped and locked by downward stroke of the piston.
5. Draw operation requires no unclamping or leveling of the bottom board.
6. Flask and bottom board are always in alignment with the pattern, thus assuring a perfect draw.

Write or phone about immediate deliveries on these and other types of J & J machines

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A COMPLETE LINE PROVEN IN SERVICE INCLUDING—

PLAIN AIR JOLTS
in 12 different sizes

JOLT SQUEEZERS
fast sturdy machines—3 sizes

JOLT STRIPPING PLATES
4 sizes ranging up to 16″ draw

JOLT, SQUEEZE, STRIPPING PLATE AND PATTERN DRAWS
Popular for medium service —2 sizes

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A heavy duty thoroughly dependable machine—portable

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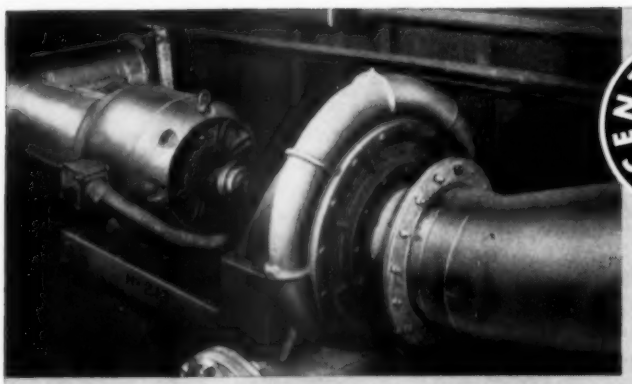
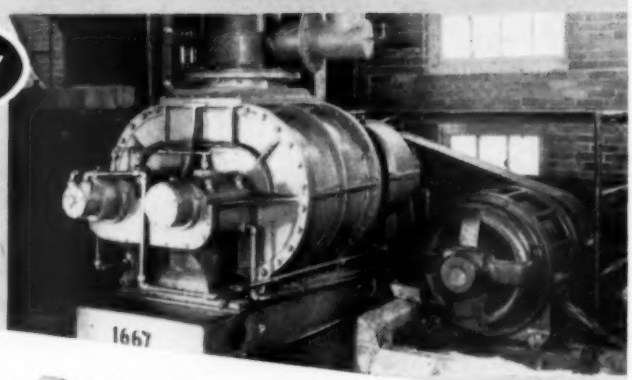


CENTRIFUGAL

R-C Centrifugal Blower, type OIB, in foundry service. Capacity 6,000 CFM, at 21 oz. pressure.

ROTARY



R-C Rotary Blower, type RCD, capacity 6,200 CFM.

LET *R-C dual-ability* SETTLE THE QUESTION

If you are in doubt about whether Centrifugal or Rotary Positive units will do the best job of handling cupola air on any specific application, you can obtain an unbiased answer from R-C *dual-ability*.

Because we build both types, in wide ranges of sizes and designs, we can make sound comparisons and can recommend without prejudice the units whose capacities, pressures, drives and other characteristics deliver the best performance.

Only Roots-Connersville gives you this *dual choice*. It comes from 95 years of designing and building gas and air handling equipment, exclusively.

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BLOWERS • EXHAUSTERS • BOOSTERS • LIQUID AND VACUUM PUMPS • METERS • INERT GAS GENERATORS

* * ONE OF THE DRESSER INDUSTRIES * *

(*Continued from page 224*)

100 members and guests of Twin City Chapter of the AFS at the Covered Wagon, Minneapolis, Jan. 6.

According to Mr. Schureman, the main objectives of a sand consultant are: To render a foundry sand-conscious and to determine current practices and the results therefrom. He went on to say that working with foundry sands is still not an exact science but an art, since there is more than one answer to certain specific questions. He described both good and bad foundry sand practice.

In his estimation, in so far as molding sand is concerned, the major factors which determine its good or bad points are: Choice of base sand, choice of bonding clay and mixing. As for testing molding sand, moisture is the most important determination followed by sand screen distribution.—*O. Jay Myers, Werner G. Smith Co.*

Philadelphia

CLYDE A. Sanders, vice president, American Colloid Co., Chicago, addressed the Philadelphia Chapter of the AFS Jan. 14 at the Engineers' Club, Philadelphia, on the subject "Foundry Sands."

He stressed throughout his talk the economical phase of foundry operations to meet competition, referring to the blending of various types of sand in order to get the necessary economical sand for a particular shop. He described the various base materials necessary in good foundry sand control and usage. The relation of density to physical properties of sand was explained. Mr. Sanders also discussed the test tube method of sand analysis.—*A. Saute, American Engineering Co.*

Wisconsin

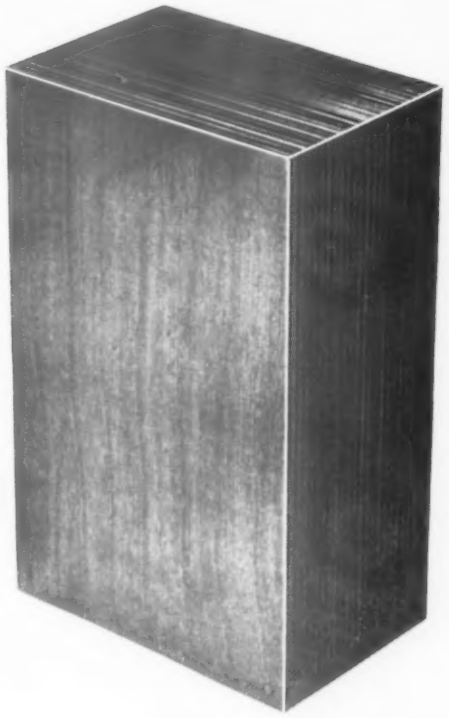
WISCONSIN Chapter of the AFS met Jan. 14 at Hotel Schroeder, Milwaukee. The popular practice of holding five sectional meetings was followed.

The steel group heard C. F. Haertel, Falk Corp., Milwaukee, speak on "The Use of Exothermic Materials for Steel Castings." Lewis Shaw, Pelton Steel Casting Co., Milwaukee, was chairman.

R. A. Witschey, A. P. Green Fire Brick Co., discussed "Refractories" at the gray iron and malleable iron session. Paul Anderson, International Harvester Co., Milwaukee, was chairman. At the nonferrous session, Paul Langley, Employers' Mutual Liability Insurance Co., Wausau, Wis., spoke on "Making the Foundry a

(*Continued on page 228*)

ABRASION RESISTANT



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has greater resistance to abrasion than materials now used.

HI-DEN — a new densified wood material used by the Foundry industry for Patterns, Match Boards and Mold Boards. Made from selected wood veneers, impregnated with plastic, laminated and then compressed at extremely high pressures — the new HI-DEN has characteristics which have produced savings of over 50% in Pattern and Match Board costs. Makes better Core Boxes, too.

ADAPTABILITY AND STRENGTH

HI-DEN is currently being used with great success for forming dies, jigs, fixtures, spinning chucks, industrial tables and parts in textile machinery. NOW — Parkwood has developed *special grades* of HI-DEN particularly suited to the Pattern and Foundry Trades. HI-DEN has the adaptability of wood with greater strength and wearing qualities than either wood or aluminum.

Here's why HI-DEN is better

- Abrasion Resistant.
- Dimensional stability.
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- Can be machined with wood-working equipment.
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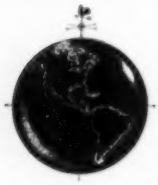

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Features you get in Schramm are: 100% water cooled, assuring ideal performance summer and winter; mechanical intake valve, forced feed lubrication. All Schramms are compact, lightweight, easy to operate.

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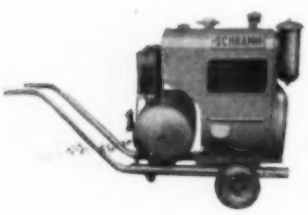
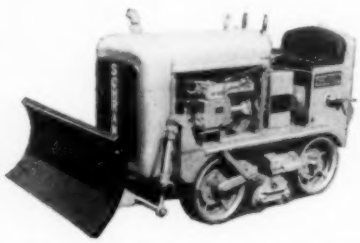
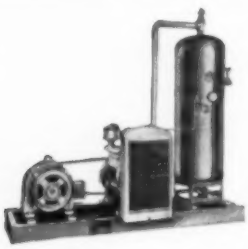


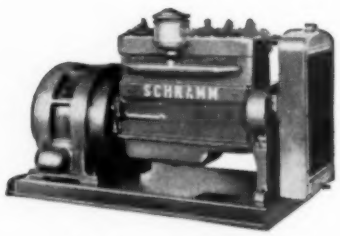
No. 20 Compressor on Shop Truck



Self-Propelled with Hydraulic Backfill Blade

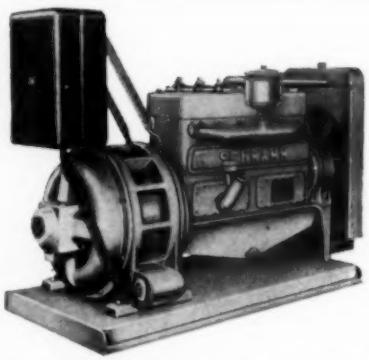


V-Belt Drive with Cooling Unit



Built-in Motor with Cooling Unit

"V" Belt on Flat Pulley Drive



Built-in Motor Drive with Cooling Unit and Starter

SCHRAMM INC.

THE COMPRESSOR PEOPLE • WEST CHESTER • PENNSYLVANIA

(*Continued from page* 226)

Better Place to Work," with A. I Tooman, Racine Aluminum & Bra Foundry, Racine, Wis., as chairma

"Specialized Ornamental Patte Making" was the subject presente before the pattern group by Em Kronquist, Art Metal Departmen Milwaukee Vocational School. J. F VanKooy of the school acted as chairman at the meeting. Davi Fahlbert, Grede Foundries, Milwau kee, addressed the technical group on "Control of Casting Defects."

Leon Decker, Allis-Chalmers Mfg. Co., Milwaukee, has been appointed chapter treasurer to replace George Tisdale, Zenith Foundry Co., Milwaukee, who has been temporary treasurer since the death of Richard Jordan last spring. Also Charles Fuerst, Falk Corp., Milwaukee, has been elected a director to replace S. E. Mueller who can not serve out his term.—*John E. Hubel.*

Cleveland Non-Ferrous

CLEVELAND Chapter of the Non-Ferrous Founders' Society met at Hotel Cleveland, Cleveland, Jan. 27. Cook Cleland, Cook Cleland Airport, Willoughby, O., and winner of the 1947 Thompson Trophy Race at the National Air Races, Cleveland, described some of his experiences as a racing pilot and discussed current developments in the airplane industry.

D. B. Kennedy, Gluntz Brass & Aluminum Foundry Co., Cleveland, and chapter chairman, presided. William Beckinbach, Proof Machine & Brass Foundry Co., Cleveland, introduced the speaker and led the discussion.—*Robert H. Herrmann.*

Central Illinois

FIRST meeting of 1949 for Central Illinois Chapter of the AFS was held Jan. 3 at Jefferson Hotel, Peoria, Ill. C. A. Sanders, American Colloid Co., Chicago, talked on "Foundry Sands." He made many comparisons between natural and synthetic bonded sands, giving the benefits and problems of each, mentioning the fact that there would be less synthetic sand in use today if more attention had been given to conservation of natural sands.

With the foundry industry fast returning to a competitive basis, more attention is being focused on costs, and sand is playing an important role, not necessarily in the cost of the sand, but in the cost of excessive scrap due to lack of proper sand control. Too many foundries depend too

(*Continued on page* 230)

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A Clearfield Mixer installation which has provided outstanding performance.

THAT'S what one of the many enthusiastic Clearfield Mixer owners told us . . . "perfect in every respect." We're very happy that the performance of our equipment brings forth such remarks.

Clearfield Mixers, with their unique revolving pan principle and their fully automatic controls, take all the guesswork out of sand preparation. And they're available in a large range of sizes for use independently or as an integral part of a sand conditioning system. You can't go wrong with a Clearfield.

There's a Clearfield Mixer for every need.

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CLEARFIELD MIXER
MIXES, TEMPERS AERATES

CLEARFIELD
MACHINE COMPANY
CLEARFIELD
PENNSYLVANIA, U. S. A.

(*Continued from page* 228)
much on the sand supplier to furnish them the proper sand instead of setting up controls to get the best sand for their use.

The beginning of the synthetic sand era found many foundries designing their equipment to take out the fines in the sand. Now it is known that a good sand must have the proper amount of fines to produce good castings with a minimum of additions to the sand heap.

The ideal sand as it comes from the supplier is not one that has an equal percentage of three or four different grain sizes, but one that has a high percentage of any particular grain size and tapers off equally about three sieves in each direction. Mr. Sanders concluded his talk by stating that numerous casting defects could be eliminated by the closer control of sand that is used.—*V. W. Swango, Caterpillar Tractor Co.*

CENTRAL ILLINOIS Chapter of the AFS celebrated its third annual Christmas party and Ladies' night Dec. 11 at the American Legion Hall, Peoria, Ill. Approximately 325 members and guests attended the party. Photos courtesy of Caterpillar Tractor Co.

Tri-State

"CORE Blowers," as discussed by Otto Ostermann, Redford Iron & Machine Co., Detroit, was a feature of the Jan. 21 meeting of Tri-State Chapter of the AFS held at Douglas Aircraft, Captains' Dining Room, Tulsa, Okla. More than eighty members and guests were present.

With the aid of a blower and various boxes, Mr. Ostermann presented his topic with demonstrations. Factors determining best blower operation are flow of sand, number of vents, blow-holes, type of sand, and the all-important moisture content.

The speaker stated that 90 per cent of corebox wear is due to improper rigging, and also that instantaneous filling is important. The speaker cited specific cases of proper rigging actually increasing the life of boxes. Mr. Ostermann went on to say that the success of any blower or rigging depends upon some form of standardization.—*F. E. Fogg, Acme Foundry & Machine Co.*

Rochester

ROCHESTER Chapter of the AFS met for its Jan. 11 meeting at the Palm Room of the Hotel Seneca. B. P. Mulcahy, foundry consultant, Indianapolis, was the guest technical speaker, his topic being "Foundry Coke and Cupola Operation."

Mr. Mulcahy stated that the question of coke has a major responsibility in the cupola melting process. However, when trouble arises it is not always the coke that is at fault. Fluctuating factors such as air, coke, scrap size, metal charge, cupola dimensions, and charging methods all contribute to make the cupola difficult to study.

In cupola operation the comparison of air rate to coke rate is of extreme importance. The speaker pointed out that air is one component over which the operator may have complete control. The balance of the rates of carbon monoxide and carbon dioxide formation determine what is going on inside the cupola. The only function of the tuyeres is to distribute the air evenly around

(*Concluded on page* 232)

V40F

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Unlimited
technical resources
and endless experiment have fashioned
Velsicol's balanced core oils
for every core making problem

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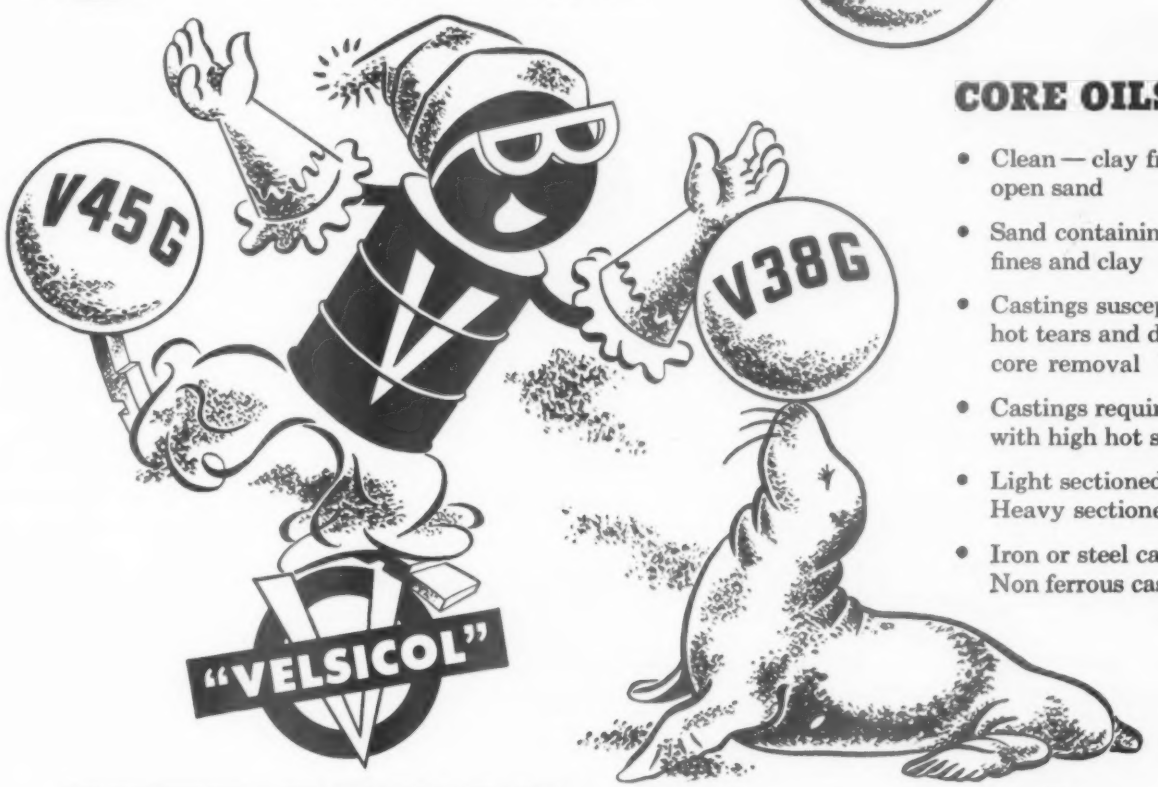

CORE OILS for

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- Sand containing fines and clay
- Castings susceptible to hot tears and difficult core removal
- Castings requiring cores with high hot strength
- Light sectioned castings
  Heavy sectioned castings
- Iron or steel castings
  Non ferrous castings

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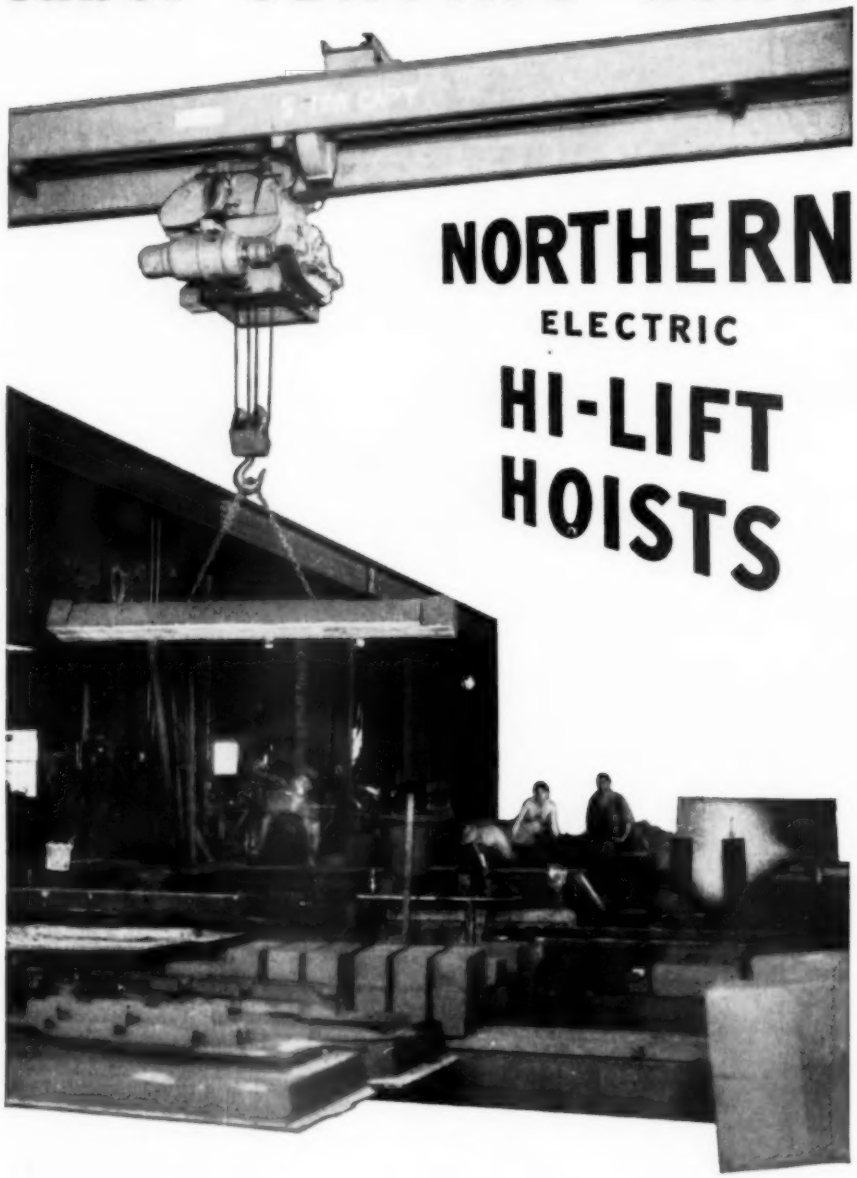

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OVERHEAD ★ ELECTRIC CRANES ★ AND HOISTS ★

NORTHERN ENGINEERING WORKS
2615 Atwater St., Detroit 7, Mich.

(*Concluded from page* 230)

the periphery of the cupola.

The speaker discussed coke properties and claimed that the physical properties, in particular size and strength, were of equal or greater importance than the chemical properties. As the size of the coke decreases, the surface area for a given amount of coke increases.

The charge density also is important since the more dense the charge, the more of the blast goes up the side walls.

Physical dimensions of the cupola set the operating limits. The bosh and refractories are not as important as operating procedure. Air rate must be selected for the melting rate and coke ratio.

Careful handling of coke is of prime importance. Small sizes should be screened out and the coke should be weighed, with booster charges used only for correction.

Mr. Mulcahy illustrated his talk with a series of interesting slides. The talk was followed by a lively discussion period.—*G. M. Etherington, Gleason Works.*

MIT

MASSACHUSETTS Institute of Technology Student Chapter of the AFS and the Foundry Educational Foundation jointly sponsored a gathering of MIT students interested in foundry and metallurgical practice at the school's Engineering Building, Cambridge, Mass. H. P. Good, president, Gray Iron Founders' Society, spoke on "The Rediscovery of Gray Iron."

Mr. Good stated that the 2500 gray iron foundries in the industry, with about 200,000 workers, shipped approximately 12½ million tons of castings in 1947, representing 78 per cent of all foundry products. Tracing the history of the early development of the product, he cited claims that the art of molding iron had become quite well advanced many centuries before Christ.

On conditions in the industry today he said that through national trade paper advertising, the distribution of printed literature and in other ways, the real story of gray iron and what it can do for the engineer, is being told to all industry.

Raybestos - Manhattan Inc., Manhattan Rubber Division, Passaic, N. J., has opened a new warehouse and office at 314 Occidental Ave., Seattle, Wash., for distribution of conveyor belting, V-belts, industrial hose, etc. The new warehouse and office will be in charge of Russell G. Heuman.

DEVELOPMENT of THE CASTING INDUSTRY

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History of foundry practice, from days of prehistoric development of metal to modern castings production. The story of man's achievements, through his use of metal, which have contributed so essentially to modern civilization.

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Idle Machines Mean Wasted Dollars

By ERNEST W. FAIR

IDLE equipment in a foundry means wasted profit dollars, for in these days of good business a machine failing to operate is a machine eating into not only existing but potential profit as well.

The causes of idle machines are well known. They are as varied as each individual foundry differs from its neighbor in the next town. Yet there are a number of problems created by idleness of machines everywhere, problems which can be either forestalled or speedily remedied.

Recent conversation with foundry superintendents in various sections of the country on the subject of how they were operating to prevent or minimize machine idleness developed suggestions and experiences which are given in the paragraphs to follow, and which can be adopted with profit in any foundry.

Faulty maintenance procedures lead to more breakdowns than any other factor today. The slackening of vigilance during the war on the part of machine operators, maintenance men and foundry executives alike has been slowly abating but it is still far from being a minor problem today.

A machine out of production means loss of productive capacity, but more important it means disruption of the entire foundry's productive capacity, and that alone should be sufficient to merit more attention to maintenance.

It is good policy to draw up maintenance schedules covering all equipment in the foundry. Each unit should have its own card in the file and this file snould be checked by foundry executives at least once a week. Maintenance checking should be as much a routine procedure as going to the bank.

Keep Cards In Front Office

Cards kept in the front office usually result in more efficient maintenance than if kept in the foundry itself. When the predetermined maintenance time occurs, the card should be sent to the foundry superintendent or the man in charge of that unit. He can be given 48 hours to make the maintenance check and report back. Such a system insures that no machine has been overlooked and also that there is a fixed responsibility for carrying out maintenance.

When this system is supplemented by the machine operators' preventive maintenance attention, it is even more valuable in the battle against machine idleness. The foundry foreman or superintendent may carry such a program by a machine-to-machine or worker-to-worker check against these cards every day, or the responsibility may be placed with the workman to report immediately even the slightest need for maintenance. Such procedure insures each individual foundry unit against being overlooked and against hasty or careless maintenance,

Every foundry is also faced with the ever present threat to production of the absence of skilled workers. Many machines in our foundries cannot operate unless skilled men or women are available to run them. Today's labor market is far from good in this respect; the sudden loss of key workers in even the smallest foundry can readily result in

(*Continued on page* 236)

S-G ALUMINUM ALLOY INGOT is produced by craftsmen whose skill and know-how assures you of uniform raw material with which to work. For all types of castings — Die — Permanent Mold or Sand Cast — aluminum alloys trademarked **S-G** are recognized for their uniform quality and the way they meet the most rigid specifications both as to chemical and physical analysis. Our complete modern research and testing laboratory facilities are available to aid you at any time.

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(*Continued from page* 234)

an idle machine. Most foundry executives are solving this problem by more dual-operation training so that shifts may be made in the present foundry force and all units still kept in operation should one or two skilled workers be absent.

There is also a tendency to keep scouting for experienced people residing in the general area of the city where the foundry is located. People engaged in other occupations, retired workers who can substitute for a brief period of time, available partly trained workers and others of like nature, frequently are available when such sudden idleness of equipment occurs. The problem is always to find them and find them in a hurry.

Such a venture is nearly always costly and frequently is not successful until the need is no longer present. The solution to the problem lies in making the search *before* the need arises, through advertisements in local newspapers, contacts with employment agencies and bureaus and actual field scouting. Then when a machine is idled through absence of a skilled operator this replacement can be readily secured and this idleness reduced to a matter of hours instead of days.

Lost days through breakdowns are also costly. Though the chance for a breakdown is a great deal less where good preventive maintenance is the rule, nevertheless it will occur. Then the problem is to keep the idle time of the unit at a minimum while the breakdown is being repaired. This calls for ready availability of men with the experience to do the job. If such men are not on the foundry staff, operating executives should know where they can be obtained within the immediate area. Some foundries are actually bringing in general repair men of their area and training them so that they will know exactly what to do and how to do it quickly when a breakdown occurs.

Stock Spare Parts

Loss of time through breakdowns can also be minimized by a good spare-part storage policy. While it is foolish to attempt to carry a spare part for every one in use in the foundry, most firms solve this problem by carrying spare parts for any item which may be difficult to obtain or which will have to be secured from a considerable distance away. If the part can be quickly obtained locally there is little use in freezing capital funds in such stocks. Maintenance records should carry data on where each such part can be speedily obtained.

Another good policy is to anticipate the need for such parts whenever possible. A good maintenance man can often estimate when machine parts are nearing the breaking point, and the foundry can order such a part when his inspection reveals such a condition. Company funds may thus need be tied up in spare parts only for short periods of time.

Many of the other causes of idle machines can be solved by readily applied solutions if these causes are recognized. Lack of material to process is a cause of idleness which may be unavoidable but which may be due to inefficient planning. Power breakdowns can cause idle machines also but then again this is a matter of applying the procedures of the foregoing paragraphs directly to these power units.

Replanning of work routine in the foundry may often solve idle equipment problems. Frequently the ad-

(*Concluded on page* 238)

WOOD-LOK replaces hot animal glue. It can be handled and machined after a clamping time of only 15 to 35 minutes* — instead of 6 to 8 hours. It sets faster than hot animal glue—yet provides ample open assembly time. Its extremely strong moisture-resistant bond gives a high degree of shock resistance in handling.

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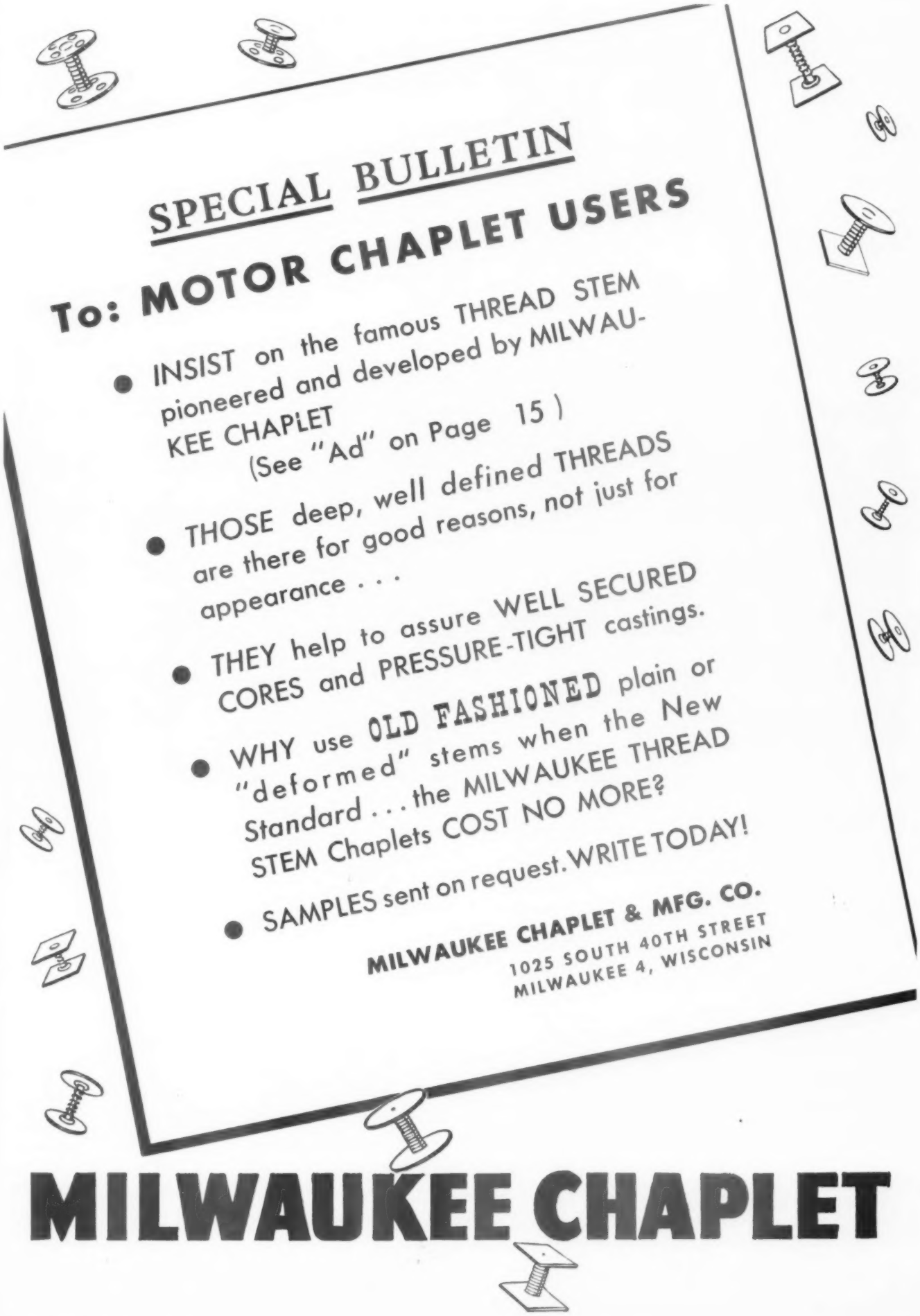

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MILWAUKEE CHAPLET

(*Concluded from page* 236)

dition of new units to keep full-time production going will pick up idle time on feeder units whose capacity is beyond the ability of succeeding units to handle.

Nothing, however, beats good preventive maintenance and a program of having available a worker replacement, in combatting idle machines in the foundries. These two factors go hand in hand and more and more foundry executives are today realizing that the second is as important as the first.

HANDLING MATERIALS IN THE MOLDING DEPARTMENT

(*Continued from page* 89)

The unit illustrated is a 6 x 10-in. vertical, centrifugal discharge type, spaced bucket elevator. It is equipped with welded steel buckets spaced on 16-in. centers on a rubber elevator belt. It can be furnished, by the insertion of intermediate sections, to operate efficiently up to a height of 45 ft, measurement being made from center to center of pulley shafts. It will handle sand at a rate of 25 tons per hour.

During the course of foundry operations, molding sand has many opportunities to pick up foreign material such as nails, gaggers and bits of metal from spillage. This material must be removed if the sand is to be reused. Removal of ferrous metals by electromagnet is shown in Fig. 8. The magnetic pulley over which the sand-carrying belt travels is electrically energized at 220 volts dc. Foreign iron particles in the sand are held tightly against the belt while the sand is dropped into the funnel which feeds the sandslinger. Just as the belt breaks contact with the pulley the iron pieces are dropped into a wire-bottomed chamber where they are collected at intervals. One manufacturer supplies such pulleys in sizes from 12 x 12 in. to 30 x 60 in. in standard or made-to-order sizes to meet requirements. The pulleys also are supplied in self-contained separator units with tail pulley, belt and control mounted in a frame. The assembly may be used as a stationary unit or may be converted to a mobile unit by mounting on casters.

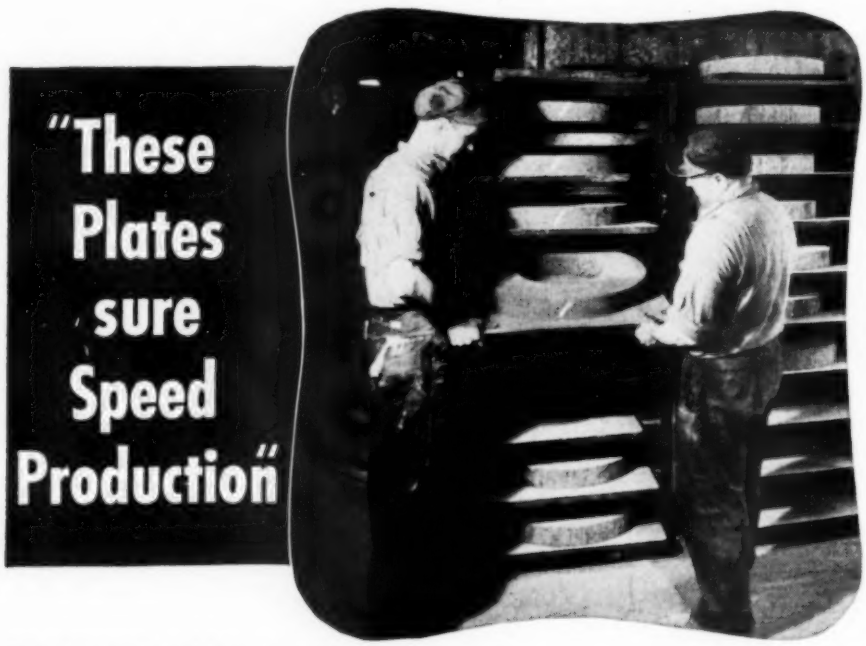
Buckets Transport Sand

Buckets play an important part in sand transportation for floor molding operations. Their use in filling flasks is shown in Fig. 11. The bucket illustrated is a single line hook-on type bucket of 1½ cu yd capacity. Various sizes are offered, the usual capacities being from ¼ to 3 cu yd. This type of bucket is comparatively easy to operate, requiring only that the bucket holding yoke be placed over the crane hook. To release the crane for other activity the bucket is simply removed from the hook.

Vibratory feeders, which were described previously, also serve to feed sand from hoppers to flasks, as illustrated in Fig. 12.

Molding sand being removed from the floor area by truck with scoop attachment for transportation to reclaiming units, is shown in Fig. 13. The scoop illustrated is 42 in. wide, has a capacity of 10½ cu ft and is equipped with replaceable cutting edge. The tractor shovel is powered by a 29-hp gasoline engine and employs hydraulically operated lifting and dumping mechanism. Some of the features of this truck include automatic "tip-back" which is accomplished by the lift arms which tip the bucket sufficiently to prevent

(*Continued on page* 240)



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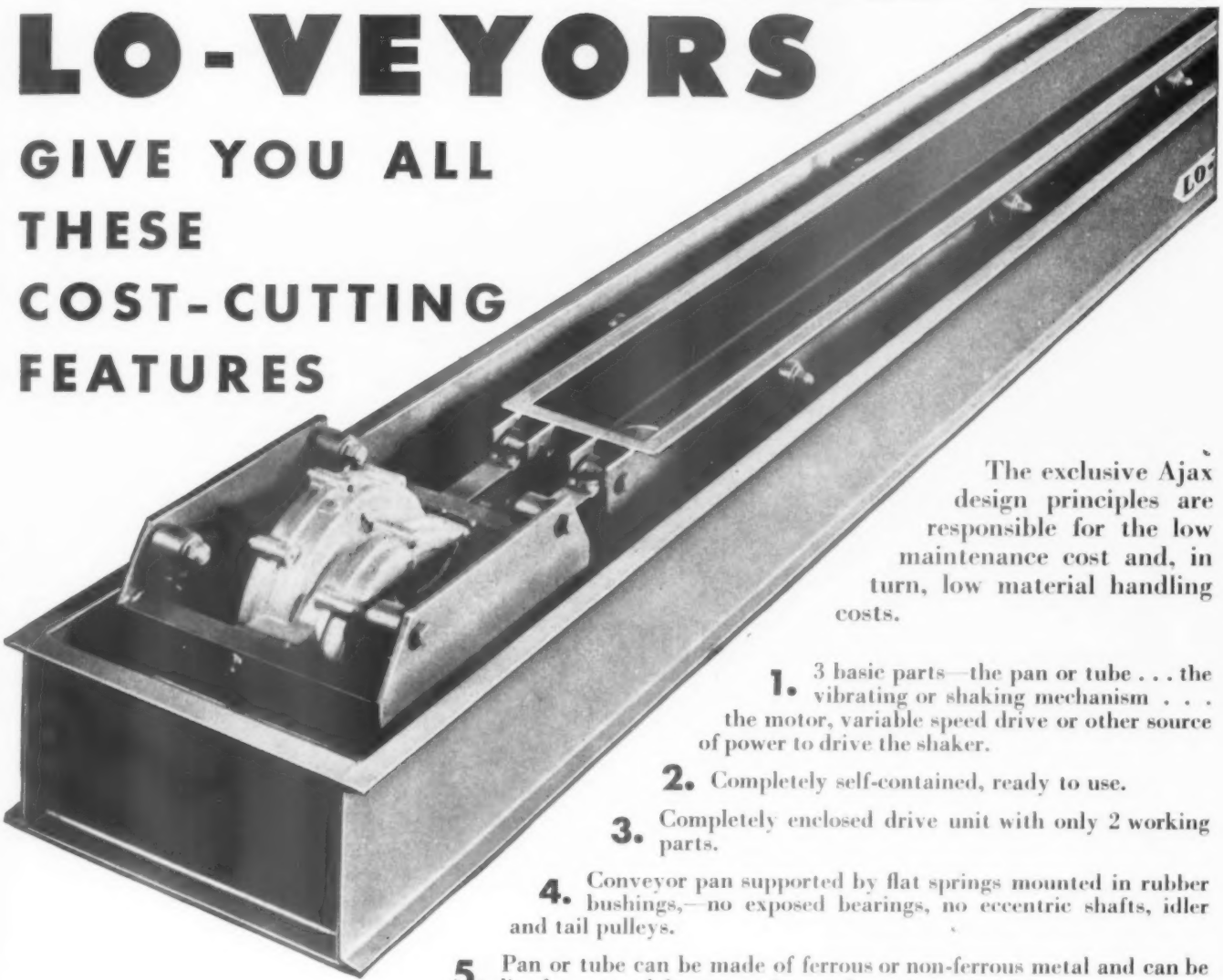

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2. Completely self-contained, ready to use.
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6. Pans available with or without covers.
7. Tubular conveyors provide gas-tight construction for critical process and explosive operations.

Write giving outline and sketch of your requirements for handling dry aggregates.

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CONVEYOR AND SCREEN DIVISION • WESTFIELD, N. Y.

(*Continued from page* 238)

spillage while the load is in transit. Loads may be dumped at a height of 56 in. instantaneously or gradually with special hydraulic snubber. Long arm reach permits dumping over edges or into compartments with a minimum of interference, it is said.

In one foundry, four such machines are used to pick up molds and castings which have cooled and hardened and dump them in an underground oscillating conveyor. Seventy tons of castings are handled every 24 hours. At the same foundry, sand from stock piles is delivered by the four trucks to more than 100 molding stations at the rate of 1200 tons of sand every 24 hours. Round trip from stock pile to molding station is over 200 ft. At night, the machines are used for general clean-up and for dumping used sand into hoppers to be transported back to the reclaiming room. Each hour an average of 53 tons of all types of foundry sand and castings are handled with an average length haul of 200 ft. This foundry estimates its savings at 110 man-hours every day and savings per ton handled at 96 cents.

Conveyors are widely used in the movement of materals, and, although there are many different types, they fall into two general groups—gravity and power conveyors. Both types find application in the molding department. Fig. 9 illustrates the use of gravity and power conveyors combined in one installation for handling flasks and molds. In this installation the molds are lifted off the molding machines and placed on the gravity conveyors in the foreground by the air hoist which moves on the monorail overhead. These conveyors run back quite a distance and the molds are poured along their length. At the end of the gravity conveyors a transfer car picks up the molds and moves them to the power conveyor which can be seen at far right in the photo. Molds move down this conveyor to the shakeout which can be seen at right. The empty flasks then come down behind the molding machines on gravity conveyors where they are stored until reused.

Sand Is Prepared for Use

Sand is taken from the shakeout, over a magnetic belt conveyor, into a bucket elevator, through a screen and into a storage bin. It is taken from the storage bin to a muller which empties onto a belt conveyor feeding into an elevator which delivers the sand to an aerator. From the aerator the sand goes to a distributing belt which passes under plows for distributing sand to molders' hoppers. This entire mechanized foundry division is housed in a 30-ft bay of the main building.

The use of roller gravity conveyors to form a production line for assembling large molds for truck frames is illustrated in Fig. 14. These drag halves are produced on the machine in left background and are transferred to the conveyor by hoist. Cores are being set along this section of the conveyor and the mold halves will be pushed along the conveyor to the right where they will be closed and the metal poured. The flasks are returned to the molding machines on another gravity conveyor.

Fig. 21 shows an adaptation of the pallet type boards across two rows of gravity mold conveyors to provide a large initial mold storage space without excessive cost. Center conveyor in the bank of five is for returning pallet boards to the molders.

Production line molding on roller

(*Concluded on page* 242)

ONLY McKEE HAS THIS SIMPLE VARIABLE CONTROL
THE NEW
McKEE
AUTOMATIC
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New in design...flange-mounted... compact...pilot-actuated...lighter in weight..pressure range 2 oz. to 4 lbs.
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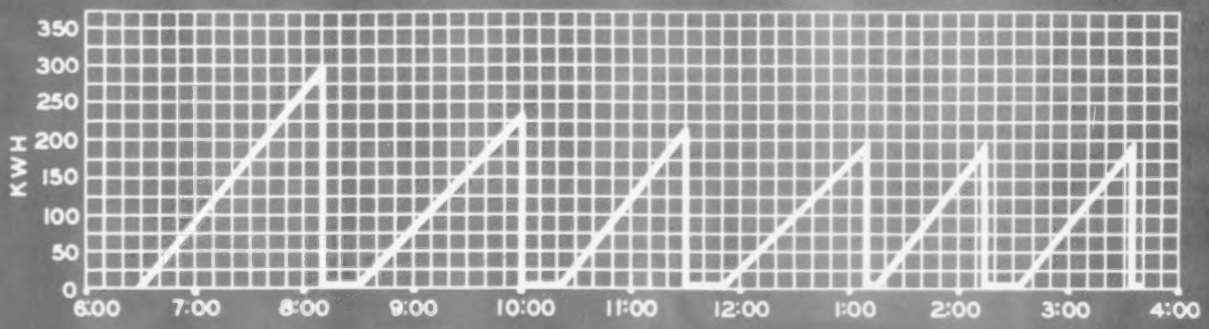

NOTES ON DAILY OPERATION OF TYPE LFY, 700-LB. CAPACITY DETROIT ELECTRIC FURNACES MELTING NICKEL:

TOTAL HOURS OPERATION—9¼ hrs.; NUMBER OF HEATS—6; WEIGHT PER HEAT—900 Lbs.; TOTAL METAL MELTED—5450 Lbs.; TOTAL KILOWATT HOURS—1323; KILOWATT HOURS PER TON—486.

PROFITS FROM DETROIT ELECTRIC FURNACE OPERATION IN PAST YEAR: $150,000.00.

NOTES ON TWO-YEAR OPERATION OF SAME FURNACES:

COMPANY—A Well-Known Automotive Plant (name on request); PERIOD—(Sept. 9, 1946 to Sept. 18, 1948); TOTAL TONNAGE MELTED—1,070; AVG. ELECTRODE USAGE—8.65 Lbs. per Ton of Nickel at .23/Lb.—$1.99; AVG. POWER CONSUMPTION—625 KWH/Ton at 1¼c—$7.81; AVG. REFRACTORY COST—$4.00/Ton.

AVG. TOTAL MELTING COST OVER TWO YEARS: $13.80 PER TON.

Maximum QUALITY CONTROL • *Low* MELTING COST

FOR FERROUS AND NON-FERROUS METALS

This record is typical of annual savings obtained with Detroit Rocking Electric Furnaces. An important additional advantage is the fine degree of quality control obtained in every melt.

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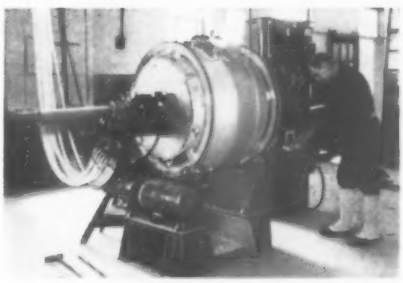
Fast, always uniform outputs and low metal losses by shrinkage save production time, labor and expense. Shop borings, turnings and scraps are reduced with least loss from oxidation.



The electric arc is automatically established clear of the molten bath at all times. The metal never becomes a part of the electric circuit. This method assures uniform temperatures within the melting chamber.

Detroit Rocking Electric Furnaces are available with automatic electrode control and automatic rocking control. There is a wide range of sizes to choose from . . . from 10 to 4000-lb. capacities. Chambers are of conical or cylindrical type. All furnaces are individually designed to meet your plant electrical specifications.

Let our engineers send you all the facts on how you reduce melting costs the year around, with the Detroit Rocking Electric Furnace. Send us your pertinent production data and we will show you the ultimate in operating economy and positive quality control with the Detroit Rocking Electric Furnace suited to your requirements in size, use and capacity. Write:

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(*Concluded from page* 240)

gravity conveyors is further illustrated in Fig. 15. The upper part of the flask is lifted by overhead crane from the empty flask line at right and transferred to the left rear where the cope is prepared. In the left foreground a completed cope is being lowered onto a completed drag on the conveyor line leading to the pouring zone. Lower part of the flask passes from the empty flask line onto the transfer car, the drag made up with the aid of the rollover-draw machine shown in the center, and the car moved into alignment with conveyor at left. The completed drag is pushed off the transfer car onto the conveyor where it is assembled with the cope as shown.

The machine molding floor of a mechanized foundry is shown in Fig. 18. Molding machines are in the rear under the sand hoppers. As the molds are made, they are put on the gravity conveyors leading to the power conveyor in the foreground. Molds are pushed onto the power conveyor and the weights which can be seen in the foreground are placed on them as they move toward the pouring station.

Fig. 19 is a view of a continuous, power-driven, car type mold conveyor and shows a mold being closed in preparation for pouring. Use of free swinging jibs with special air hoists for lifting mold halves from molding machines and placing them on a car type power conveyor is illustrated in Fig. 16.

Air hoists are further illustrated in Fig. 20. This shows an air motor hoist equipped with roll-over rig for cleaning bottom of cope before lowering. The hoist illustrated is of 500-lb capacity and has a maximum lift of 15 ft at the rate of 53 fpm at 80 lb air pressure. Air hoists are available in a number of capacities, one manufacturer offering industrial air motor hoists with ratings from 200 to 20,000 pounds capacity.

Use of tramrails and an electric hoist in conjunction with roller conveyors for moving materials in the molding department is shown in Fig. 17. This is a view of the pouring side of the molding machines in a mechanized foundry making extensive use of tramrails. The flasks roll from the machines to the closing station shown. A hoist, traveling on a tramrail bridge, lifts copes off a roller conveyor and moves them to the drag conveyor. When the flasks are closed they are moved directly on the tramrail system to the bridge serving the pouring conveyor. The equipment illustrated is of 3000 lb capacity.

Source of Illustrations

1. Clark Industrial Trucks Division, Clark Equipment Co., Battle Creek, Mich.
2. Bell Aircraft Corp., Buffalo
3, 12. Syntron Co., Homer City, Pa.
4, 7. Jeffrey Mfg. Co., Columbus, O.
5, 19. C. O. Bartlett & Snow Co., Cleveland
6. Cleveland Formgrader Co., Cleveland
8. Stearns Magnetic Mfg. Co., Milwaukee
9. Newaygo Engineering Co., Newaygo, Mich.
10. National Engineering Co., Chicago
11. Wellman Engineering Co., Cleveland
13. Frank G. Hough Co., Libertyville, Ill.
14. Standard Conveyor Co., North St. Paul, Minn.
15, 18. Logan Co., Louisville
16. American Monorail Co., Cleveland
17. Cleveland Tramrail Division, Cleveland Crane & Engineering Co., Wickliffe, O.
20. Ingersoll-Rand Co., New York
21. Chain Belt Co., Milwaukee

Editor's Note: A future article in this series, dealing with the pouring department, will continue the discussion of conveyors for movement of molds.

National Founders Changes Name

On Feb. 10, the National Founders Association changed its name to National Foundry Association. The change is intended to more properly identify the association's activities. Headquarters continue at 120 South LaSalle St., Chicago.

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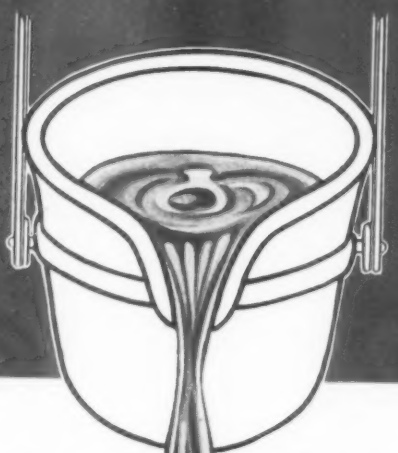

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Fig. 1—View of the pouring floor in new foundry of Huber Mfg. Co., Marion, O.

New Gray Iron Foundry

Replaces 60-Year-Old Unit

A NEW gray iron foundry has been occupied by the Huber Mfg. Co., Marion, O., manufacturer of road building and maintenance equipment. Part of a long-range building program which includes a new factory opened last spring, the new foundry was under construction for 14 months and was completed during the company's observance of its 85th anniversary year.

The 110 x 240-foot building is of brick and steel construction. Overhead and side wall windows, with 12,000 square feet of hammered glass, let in floods of daylight on the working floor and provide excellent cross-ventilation. Augmenting the natural daylight are thirty 500-watt lights in the molding department and twenty 200-watt fluorescent tubes in the core, cleaning, and bench molding

(*Continued on page* 246)

Fig. 2—Specially designed cars move raw materials from the foundry yard to the cupola charger

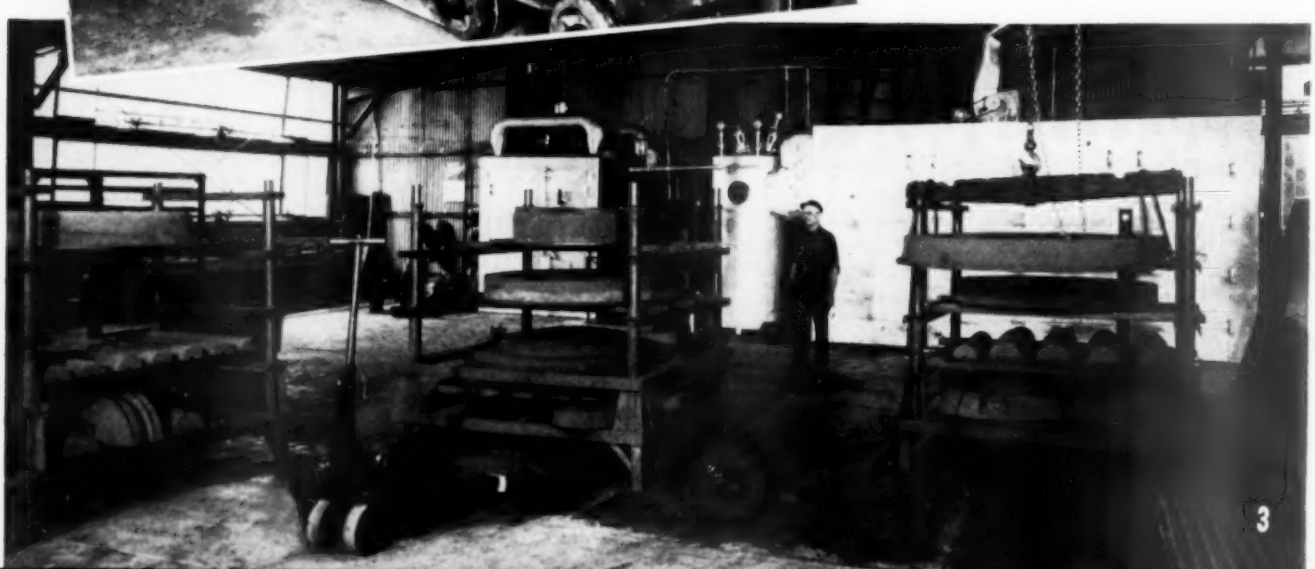

Fig. 3—Foundry coreroom employs rack type gas-fired ovens

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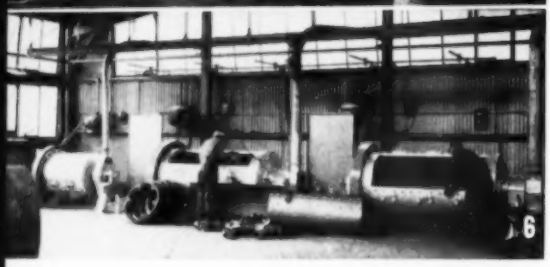

(*Continued from page* 244)

departments, giving the foundry a total of 19,000 watts of electric lighting.

"With the new foundry adjacent to the new factory building, the entire setup is for continuous motion of materials and machines in one direction without backtracking," according to W. F. Ehrick, plant manager.

Reinforced concrete bins store sand and coke. Scrap, pig iron and coke are brought into the 19-acre Huber site on a spur track and unloaded at the far east end of the foundry. From the cleaning room in the foundry, finished castings are trucked across a 20-foot paved area into the machine shop, and after machining and inspection become part of a machine on the erecting floor. The machine moves on to the testing department, into the paint shop and finally to the shipping department, all in a forward movement.

Fig. 4—Foundry Superintendent A. J. Tower, right, and Cupola Tender Wilson Donaugh look on as the cupola is tapped

Fig. 5 — Pouring a 1600-pound casting

Fig. 6—Removing cleaned castings from two of the three tumblers in the cleaning room

Fig. 7 — The brick enclosure houses lockers and showers

Both the coreroom and cleaning room are part of the new foundry. When the 60-year-old foundry which is now used for storage was in operation, the cleaning room was in another building at a distance from both the foundry and the machine shop.

Don A. Howard, president and general manager, Mr. Ehrick and A. J. Tower, foundry superintendent, worked closely as to the site, layout and construction. The plans were drawn by Mr. Ehrick with the assistance of Mr. Tower.

Loading and weighing of scrap, pig iron and coke, charging the cupola, and dumping the cupola, all are automatic operations in the new foundry. Main and spur narrow-gage tracks run from stock piles in the yard into the building, over a scales and up to the mechanical skip hoist cupola charger. Manually dumped into the skip, the cars are sent off on the spur track back to the yard for another load of from 800 to 1000 pounds of metal or coke. The cars were designed and made at Huber. A 5-hp motor operates the skip hoist, which moves up to the charging door of the cupola where an automatic trip dumps the contents.

Dumping the cupola, a crank winch operation in the old foundry, is now fully automatic by means of an air motor winch and cable.

The Huber frame and welding departments constructed the new 60-inch diameter, 48-foot high cupola to standard designs by Mr. Tower. Eight feet higher and with 25 per cent greater capacity in charges than the old cupola, the new furnace melts approximately 20 tons of metal a day.

Molders make and pour their own

(*Concluded on page* 248)

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(*Concluded from page* 246)

molds. Yearly production is approximately 55,000 different molds. The largest casting is a 7800-pound compaction roller, and the smallest is a 4-ounce ratchet and pawl.

Many of the 55,000 patterns stored are for casting repair parts for combines, tractors, separators and corn huskers, farm machinery which the company discontinued producing about five years ago when production was concentrated on road building and maintenance equipment. All Huber machines use castings from the foundry, requirements ranging up to 50 individual castings for certain types of equipment.

Manual moving of ladles on small cars from the cupola to the pouring floor in the old foundry is eliminated in the new building by a 7½-ton capacity crane with a 60-foot span over the high bay. The new crane handles any one of four ladles ranging from a half-ton to 4½-ton capacity. In the new foundry coreroom, the sand is automatically moved in and out of the bins, and in the cleaning room new high-speed grinders clean the castings.

The foundry is heated by blowers suspended over the working areas. In summer the blowers serve as cooling units. As a time-saving and health measure, employees have easy access to four drinking fountains. In a brick enclosure at the northeast corner of the high bay, the men have lockers and showers. A circular wash-up basin is another time-saving convenience at the entrance to the locker and shower room.

AJAX-WYATT ELECTRIC FURNACE

This line frequency induction furnace, so universally used in the wrought brass industry, is now, because of improved linings, available for melting all copper base alloys used in the foundry industry.

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STEELMAKING AT A BRITISH FOUNDRY

(*Continued from page* 83)

in the bath but which is free to attack the slag line.

The presence of a green melting slag infers that the slag is low in iron oxide and that equilibrium is being approached. Such a slag will result in high residual silicon and manganese contents which, in turn, favor hydrogen absorption; this leads to increased susceptibility to pinholing. Under these conditions the carbon-iron oxide reaction is sluggish because the dissolved iron oxide in the bath is held at a low figure by the residual silicon. An increase in temperature is needed to start the carbon boil, as it increases the rate of oxidation of silicon and also the dissolved iron oxide in equilibrium with a given silicon content. In such cases the oxidation of silicon must be assisted by iron ore addition before the commencement of the boil.

The ideal is to have sufficient iron oxide in the slag to oxidize the silicon and manganese down to less than 0.15 per cent before the temperature is high enough for the carbon boil to begin.

Fracture samples are taken for carbon and the boil continued by ore additions until the required figure is reached. A bath temperature of about 3000° F is maintained throughout the boil. As soon as the desired carbon is approached a sample is sent to the laboratory for carbon determination.

On high-carbon heats oxidation is continued until the silicon and manganese contents are below 0.15 per cent and the bath is on a good brisk boil. If the carbon is then too low, hematite iron is used as a recarburizer.

Refining—Results of the carbon estimation are normally received in ten minutes, and 120 pounds of silicomanganese are then added to the bath. Seven or eight minutes later a sample is poured in a chill mold.

Under normal conditions this sample should be just sound, the slag green with a black skin and the temperature judged visually to be around 3000° F. If the manganese specification is 0.50-0.70 per cent, a further 90 pounds of silicomanganese and 10 pounds of ferrosilicon (75 per cent Si) are added.

A rising sample, usually accompanied by a dark green or black slag, indicates that the slag contained a marked excess of iron oxide when the initial silicomanganese additions were made. The degree of over-oxidation is estimated by the melter, the final addition of silicomanganese addition is increased by 5-20 pounds and the ferrosilicon addition by a similar amount.

Deeply sunk sample and a light green slag result from making the initial deoxidation additions when the slag and metal were approaching equilibrium. In such a case it is necessary to reduce the final silicomanganese additions by anything up to 40 pounds.

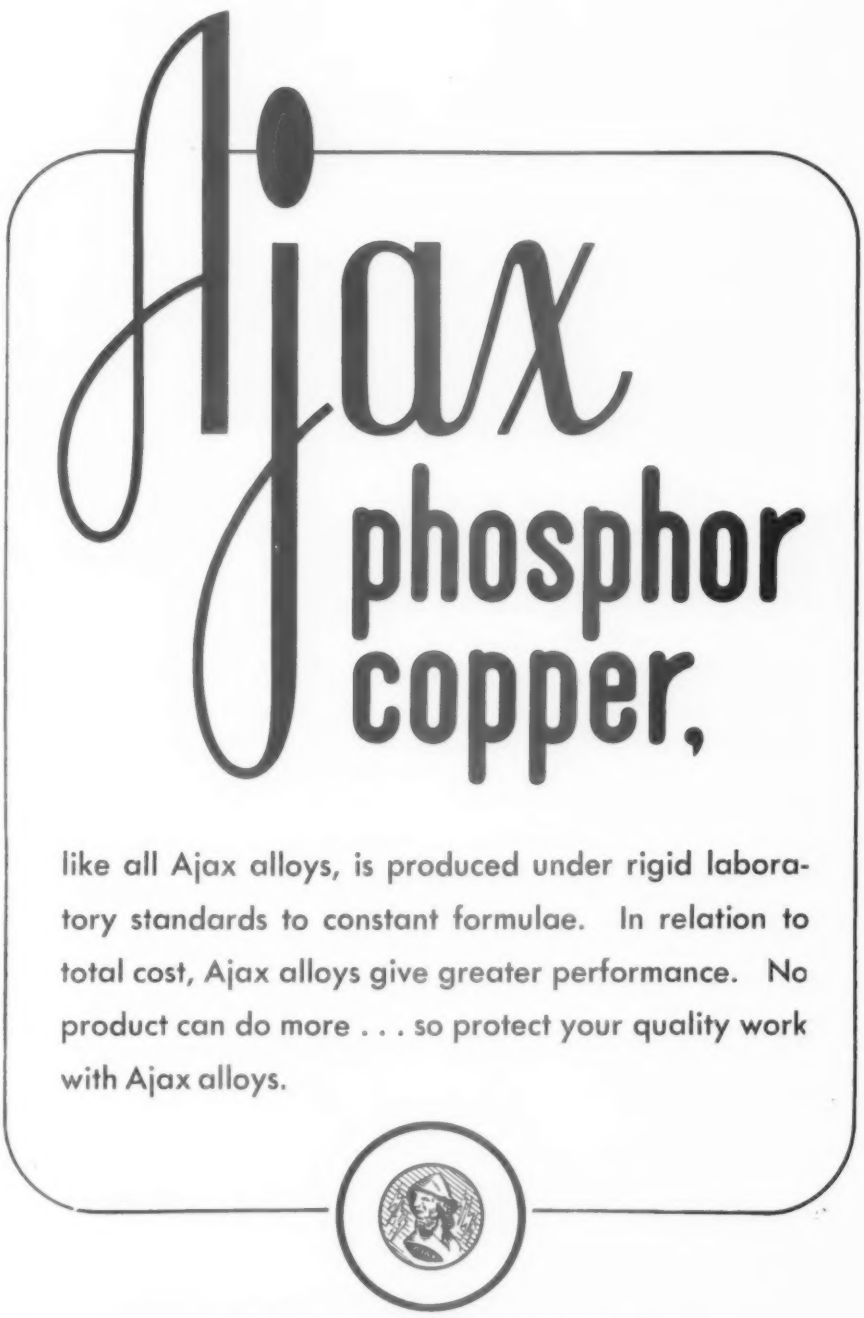
Make Temperature Adjustments

Five minutes after the last addition a sample is poured into a freshly rammed green sand mold, further additions of ferrosilicon with or without silicomanganese being made if the sample is unsound. A reading is taken with the immersion pyrometer and final temperature adjustments are made over the last few minutes while the ladle is being prepared. An aluminum addition of 3 pounds per ton is made for grain size control and to prevent the formation of intergranular inclusions.

Immediately the first half of the heat has been poured into the ladle the slag line is patched with silica sand, giving it time to burn in before tapping the second portion. On manganese specifications between 0.5 and 1 per cent the manganese and silicon loss while waiting to tap the second half of the heat normally requires a silicomanganese addition of 1 pound per minute of waiting time. This is varied slightly by the melter according to the slag condition. If the slag is apple green with a thin, coffee-colored skin, he will reduce the addition or increase it and add ferrosilicon if the slag is dark green with a black skin of appreciable thickness.

If two different specification are being met, a sample is sent for carbon and manganese determinations immediately before taking the first ladle of metal. The manganese is made up to 0.20 per cent above the top limit of the specification as soon as the results are received, and the furnace tapped five or ten minutes later. When high carbon steels are made from the second half of the heat a certain amount of iron is thrown in before the carbon result is received, so that the final additions are not heavy enough to cause excessive chilling of the bath. Pearlitic 1½ per cent manganese steels are always made from the second half of the heat, and the silicomanganese and ferromanganese are added three to five minutes before tapping, taking the manganese to 0.60 per cent above the upper limit.

Patching—The furnace is levelled off when the second ladle has been taken away and the bottom is tested to see if there are any holes in it. If any metal remains, the furnace is back tilted, dry sand rapidly thrown onto the base of the tapping slope and an attempt made to drain the furnace. Some of it usually runs off into the ladle pit, but the furnace is allowed to stay in the fully tilted position long enough for any steel left in to set on the tapping slope. This enables the bottom to be repaired with dry sand without cover-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ing up any steel, as this would undoubtedly cause trouble at a later date. Any metal remaining on the slope can be removed by a long hook so that this part of the furnace can be repaired as well.

When the bottom has really deep holes which cannot be rapidly drained and repaired, it is better to charge coke to the furnace after drying up and patching so that three or four hours can be spent burning in. After the coke has been raked out, the furnace is charged by electromagnet to avoid the shock of dropping the full charge in from the bucket and possibly disturbing the newly patched hearth.

The log of a typical heat is set out below:

Charge—5500 lb foundry scrap, 2500 lb foreign scrap (heavy), 1500 lb foreign scrap (light), 2000 lb chipped turnings, 500 lb bushy turnings.

2:30 a.m.—Commenced charging.

2:33 a.m.—Finished charging.

2:35 a.m.—Power on. 160 v at 5000 amp.

5:00 a.m.—Fracture estimated at 0.50 per cent carbon. Slag green, 100 pounds of ore added.

5:10 a.m.—Fracture estimated at 0.45 per cent carbon. Power input reduced to 140 v at 5000 amp. Slag black and thin.

5:25 a.m.—Clear melt. Fracture estimated at 0.40 per cent carbon. Slag black and thin; metal cold, no action on the bath. Laboratory analysis: 0.43 per cent C; 0.30 per cent Mn; 0.036 per eent P; 0.037 per cent S; 0.25 per cent Ni; 0.06 per cent Cr and 0.01 per cent Mo.

5:40 a.m.—Bath commencing to boil. 100 pounds of ore added.

5:50 a.m.—Bath boiling vigorously. 200 pounds of ore added.

6:05 a.m.—Fracture estimated at 0.22 per cent carbon. Power input reduced to 120 v at 3000 amp.

6:10 a.m.—Laboratory analysis. 0.19 per cent carbon. 50 pounds of limestone added.

6:15 a.m.—Fracture estimated at 0.18 per cent carbon. Slag medium green, black skin. 120 pounds of silicomanganese added.

6:25 a.m.—Chill sample well killed. Slag bottle green, thin black skin. Temperature estimated at 3000°F. Power input raised to 120 v at 5000 amp. 90 pounds of silicomanganese and 10 pounds of ferrosilicon (75 per cent Si) added.

6:33 a.m.—Sample in green sand mold well piped. Slag emerald green with dark brown skin. Immersion temperature 3035°F. Laboratory analysis: 0.20 per cent C and 0.65 per cent Mn.

6:35 a.m.—First tap. 8 pounds of aluminum in the ladle.

6:38 a.m.—Banks patched.

6:43 a.m.—Power on. 120 v at 5000 amp. 300 pounds of hematite iron added.

6:50 a.m.—300 pounds of hematite iron added.

6:55 a.m.—Slag light green, coffee-colored skin. 47 pounds of silicomanganese added.

7:00 a.m.—Sample in green sand mold well piped. Immersion temperature 2970°F.

7:05 a.m.—Second tap. 8 pounds of aluminum in the ladle.

7:10 a.m.—Finished patching.

7:15 a.m.—Electrodes slipped. Furnace ready for charging. First ladle analysis: 0.20 per cent C; 0.63 per cent Mn; 0.35 per cent Si; 0.037 per cent P and 0.036 per cent S.

Mechanical properties: Yield point 47,000 psi, maximum stress 70,000 psi, elongation 38 per cent and reduction of area 56.7 per cent.

Second ladle analysis: 0.53 per

(*Concluded on page* 252)

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(*Concluded from page* 250)

cent C; 0.93 per cent Mn; 0.43 per cent Si; 0.036 per cent P and 0.034 per cent S.

Mechanical properties: Yield point 69,000 psi, maximum stress 114,000 psi, elongation 16 per cent and reduction of area 23.4 per cent.

Future Developments—There are few acid electric furnaces in England and the steelmaking technique is not yet as highly developed as it is in the United States. Progress is being made at this plant, however, in the use of low iron oxide finishing slags of the lime-silica-alumina type similar to those used on some British high frequency induction furnaces. Preliminary results are very encouraging with the greater manganese yield and improved quality far outweighing the disadvantage of the slightly longer operating time.

Casting Practice—The ladles used are lined with 2-in. thick firebrick with 1 in. of backing material. Fireclay rod covers prove quite satisfactory provided the calcium fluoride content of the basic finishing slags is kept as low as possible. Graphite stopper ends are regarded as essential. A 1¾-in. nozzle is normally used for the general run of castings and a 2-in. for the big jobs which are cast fairly cool.

Power and Raw Material—Requirements of nonmetallic materials on the basic furnace, expressed in pounds per ton, are as follows:

Iron ore 70, limestone 130, sand 10, fluorspar 5, calcium carbide 13, dead-burnt dolomite for patching 30, eight-in. diameter graphite electrodes 13.

Lower consumption figures are: Melting 500 units per ton, oxidizing 50 units per ton, refining 200 units per ton.

Refractory life is as follows: Roof 45 heats, walls 72 heats.

Requirements of nonmetallic materials on the acid furnace, expressed in pounds per ton, are as follows:

Iron ore 70, limestone 14, sand for patching 13, eight-in. diameter graphite electrodes 11.

Power consumption: Melting 450 units per ton, oxidizing 150 units per ton, Refining 25 units per ton.

Refractory life: Roof 250 heats, walls 250 heats.

Shop Performance—Production at the rate of 1 ton per furnace hour is regularly maintained despite normal operational delays. These are usually split up as follows, all in minutes per heat: Broken electrodes 1.0, electrical 2.0, mechanical 2.0, laboratory 2.0, power station 2.0, foundry 11.0, miscellaneous 5.0 and split heats 25.0.

Production is usually in the region of five hundredweights (560 lb) of liquid steel per man-hour. This includes all labor for charging, making and casting the steel but not labor expended on relining the furnaces or roofs.

Conclusion—The idea of using an acid and a basic furnace in the same shop has proved to be a success, enabling the advantages of each type to be fully exploited. Of course, it cannot be categorically stated that this is the perfect combination; obviously the type of steel and castings made in the foundry and the availability of low sulphur and phosphorus scrap are two powerful factors to be considered.

The author wishes to express his thanks to K. & L. Steelfounders & Engineers for granting him permission to publish this article and to F. W. Rowe, managing director, without whose foresight the plant would never have been built and whose advice and encouragement contributed so much to its success.

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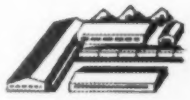
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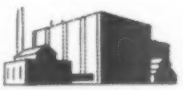
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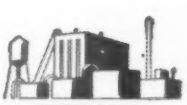
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But although the mills are now working at capacity, the greatly increased demand for steel and castings has outstepped the supply of the heavy scrap that makes the best steel—and at the fastest rate.

The quickest way to increase the production of steel and castings is to increase the supply of heavy scrap.

That is why we are calling on plants in NON-METALWORKING industries to provide the needed heavy scrap NOW.

One million extra tons are needed!

You Have the Heavy Scrap Needed to Make More Steel

Enough obsolete machinery, equipment and parts are being carried as useless inventory in *non*-metalworking plants to give a big push to the production of steel. Surveys have proved this.

The trick is to get that old iron and steel into the hands of the steel producers and foundries.

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To help increase steel production . . . provide more steel for fabricating the equipment you want . . . *to build an emergency reserve for national security* . . . turn in your useless heavy scrap to your local scrap dealer.

What You Can Do to Help Step Up Steel Production

1. Appoint one top official in your plant to take full responsibility for surveying the plant and getting out the heavy scrap.
2. Consult with your trade association's Scrap Drive Committee about its program to help the scrap drive.
3. Call on your local scrap dealer to help you work out a practical scrapping program.

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Sterling WHEELBARROWS

A 4825-1a

BETTER PATCHING IMPROVES CUPOLA OPERATION

(*Continued from page* 69)

be varied to compensate for the variation in size of the cupola. Some operators change air rates, coke ratios and even metal charges through the day. Many foundrymen have obtained benefit from a coke split at "10, 2 and 4." The best remedy is to keep the cupola dimensions as uniform as possible by careful consideration of good patching practice.

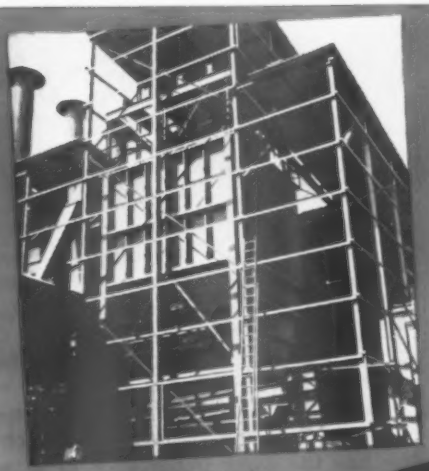
Without detracting from the importance of good materials, we would like first to emphasize the importance of workmanship. Workmanship, or the "human element," becomes particularly important when attempting to compare the practices of two different foundries. A given material may prove ideal in one foundry and yet appear poor in another. This must be true so long as cupola patching remains a hand operation. The quality of the patch depends to some extent upon the skill and care of the workman. In addition, we must recognize that a man may be skilled with one material and completely inept with another. It is for that reason that some foundries get their best results with materials which are actually of inferior quality. We are badly in need of mechanical devices to reduce the variation in quality of patching and to permit the foundryman to use the best possible materials to maximum advantage.

Maintain Uniform Lining

It would seem obvious that in order to have uniform cupola operation we must start with the same size cupola each day. How else can we obtain uniform operation? However, this simple maxim is not always followed. Many cupolas start each day with a different diameter and with a variation in quality of lining. Some of this variation is simple carelessness excused by insufficient recognition of the importance of uniformity. Sometimes we forget that "the final total can never be more accurate than the least accurate of its subtotals" or "a chain is no stronger than the weakest link."

Some of the lack of uniformity can be explained by the limitations of the materials. We are all acquainted with the difficulty of "a square peg in a round hole," yet we sometimes try to patch a round cavity with a rectangular brick. This type

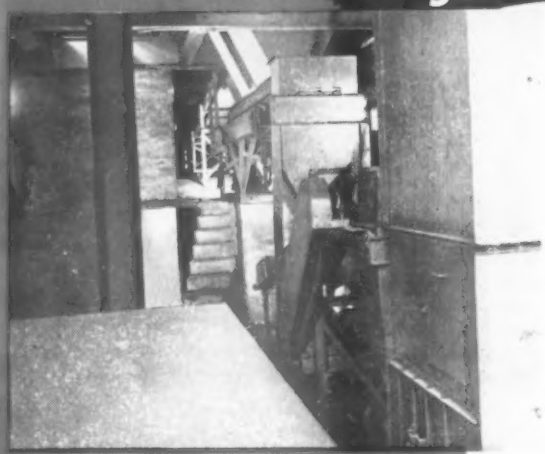
(*Continued on page* 256)



Shakeout sand bin (capacity 250-tons) and apron conveyor to muller.

Discharge chute and conveyor from sand muller. Note readily adjustable New Way belt take-up.

ALLIS-CHALMERS HANDLES SAND THE NEW WAY...

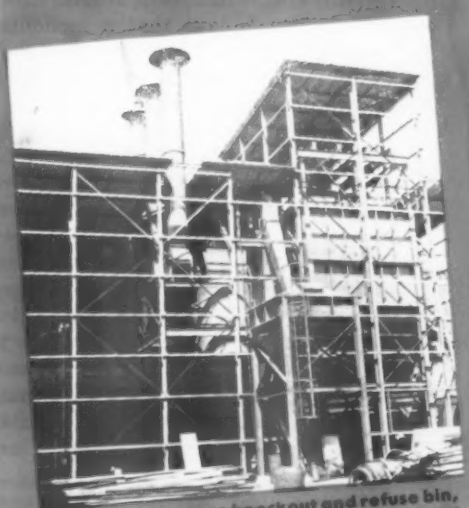


One of the two 24" apron conveyors for delivery to magnetic belt and screen.

In this modern Allis-Chalmers foundry, sand moves in a smooth cycle . . . from molding stations . . . to shake-out . . . to bins . . . to conditioning. All movements are streamlined and automatic, with no lost motion or manual effort.

New Way equipment in the Allis-Chalmers foundry includes: a turntable, conveyors, apron conveyors, sand storage bins, plate feeders, core knockout, elevators, and refuse bin with sand gate.

New Way Sand Handling Systems definitely cut costs. We can point with pride to many progressive foundries that are doing it the **New Way.** Send for literature.



25-ton core knockout and refuse bin, center foreground. Shakeout sand storage bin at right.

Turntable, photographed from pit, showing sturdy roller-bearing rollers and spill sand conveyor.

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THE New Way LINE

Sand handling, cooling and conditioning equipment, mold conveying systems, reclaiming units, rapless core drawing machines.

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Does your present Cost System enable you to figure INDIVIDUAL JOB COSTS, thus insuring a profit on every casting handled in your foundry—or—are you relying on antiquated methods of costing which can supply only an overall picture of your average casting costs?

If yours is the latter method, you are OVERESTIMATING ON PROFITABLE WORK causing its placement elsewhere, and UNDERESTIMATING ON UNPROFITABLE WORK, getting it, and consequently suffering a loss.

Why not inquire about our system which will permit you to PREDETERMINE COSTS and hence GUARANTEE PROFITS.

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Loose molding labor $1.70 per hour 8 hours	$13.60	Machine molding labor $1.59 per hour 8 hours	$12.72
Casting weight, 5 pounds each 25 molds per day—125 pounds		Casting weight, 5 pounds each 125 molds per day—625 pounds	
125 pounds metal @ .20 lb.	25.00	625 pounds metal @ .20 lb.	135.00
Cleaning cost at .026 lb.	3.25	Cleaning cost at .026	16.25
Shrinkage 6%	1.50	Shrinkage 6%	8.10
	$43.35		$172.07
COST PER CASTING $1.73 PLUS		**COST PER CASTING $1.37 PLUS**	

36c PER CASTING SAVED OR $45.00 PER DAY, PLUS THE FACT THAT YOUR CUSTOMER RECEIVED PROMPT DELIVERY, BETTER CASTING DUE TO UNIFORM PARTING AND GATING.

Estimated Cost of Super Tamastone Match Plate:

16 pounds Super Tamastone @ .18	$2.88
1 hr. Molders time	1.70
1 hr. Cleaning	1.50
* Demountable Frame	11.50
	$17.58

* Frame should not be included as it can be used for other jobs.

TAMMS SILICA CO., 228 N. La Salle St., Chicago 1, Ill.

(*Continued from page* 254)

problem is solved by monolithic patching materials. Like anything else, monolithic patches should be properly prepared. Many monolithic or "mud" patches are damned because of misuse of materials. These cases should not detract from the basic possibilities of the materials.

One principle in cupola refractory life is to dry before using. Foundrymen try to dry as well as they can in the time available. However, they do not all control the original moisture. Again we are confronted with lack of uniformity. Perhaps it has not been clear that moisture control has the same importance in a patch as it does in a mold. In fact, a monolithic patch is basically a synthetic molding sand of a specialized type. Moisture actually controls green and dry properties of the patch, plus controlling the rate of drying.

Reduce Water Content

Excess water in any patch using clay affects expansion and contraction. It produces buckles and scabs in a cupola, just as surely as it does in a mold. In a cupola this defect results in spalling, burning-through and bridging over the tuyeres. Sometimes we forget that bridging is almost always a patching problem. It may be aggravated by poor flux technique but the basic cure lies in the refractory and the method of patching.

Most daubs or muds are used too wet to make the patching job easier for the operator. As a result, many foundrymen believe that a monolithic patch can not be used for long heats. Certainly "soup" or slurry patches are not satisfactory for long heats and, in fact, are not economical for short heats. They can be put in quickly and with little effort, but what about the cost of a bad bridge resulting from such practice? What of the high cost to flux these linings in an effort to stop a bridge? A simple mathematical calculation will convince one that about 70 to 80 per cent of the flux or stone used does nothing but make the lining sufficiently liquid to flow out the slag hole when such "soup" patches are used.

A moisture-controlled quality ganister and clay patch is capable of extended life in service when rammed to maximum density and uniformity. Such patches have given longer service records than the original brick lining and, therefore, have contributed to good cupola operation. In many operations, a good monolithic patch will outlast any other mate-

(*Continued on page* 258)

Brief Notes for Busy Foundrymen

THE BEGINNING AND THE END . . .

THE MULLER

Not enough can be said about mulling and aerating. In most foundries the muller will pay for itself by obtaining as near maximum green strength as possible. Aerating is important to the moulder, as it makes the sand more fluffy and easier rammed about the pattern. Many types of mullers, pug mills or paddle mixers are available, and each has advantages and disadvantages which can be clearly pointed out by companies handling such equipment. A unique method of rebonding foundry sands by first placing the bond in a water slurry and then adding to the mixer, pug mill or paddle mixer or muller that are directly on the sand floors, is rapidly gaining prominence and also saving money in the purchase of bonding agents. Write for Data 241, "Sperser Method of Rebonding Molding Sand".

THE SHAKE-OUT

It is wise to allow an apprentice or a new man in the foundry to observe the shake-out and point out its importance, as one standing at the shake-out can readily see if the sand is collapsing as it should and if the sand is burning-on to the castings. All gating arrangements can be clearly seen, many casting defects such as cold shuts and misruns can be observed, and pouring can be observed just as well at the shake-out as well as the pouring floors in determining excess metal loss or pouring short. Many other production operations can be noticed at the shake-out whereas they may be overlooked at the actual operations. A good sand man always visits the shake-out at least once each hour to observe the manner in which the castings are peeling and whether or not the sand is passing through the shake-out as it should.

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If core rod costs are a problem because of costly hand straightening or excessive purchases of new stock, the Core Rod Straightener will return you a nice profit.

A Chicago foundry, for example, saved 50% on the purchase of new materials and by replacing costly hand-straightening saved over 2,000 hours yearly. In shops where the machine is used the scrap pile is a thing of the past . . . labor and material costs go down . . . and the savings are sufficient to quickly return the investment.

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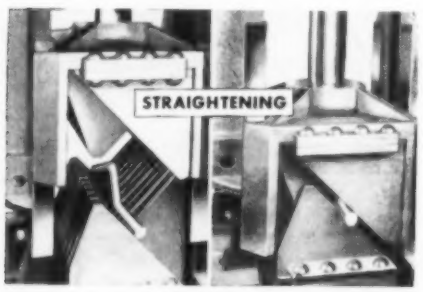

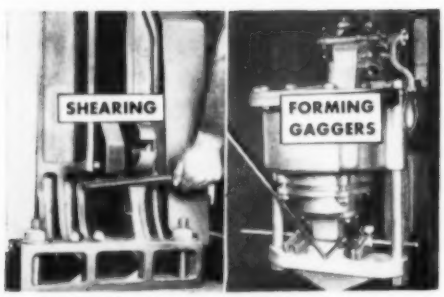

American CORE ROD STRAIGHTENER

AMERICAN WHEELABRATOR & EQUIPMENT CORP.
505 S. Byrkit St. Mishawaka 2, Indiana

(*Continued from page* 256)

rial.

One way to reduce the amount of burn-out in a cupola is to put in less patch material. This is contrary to the old technique of putting the greatest amount of patch at the zone of maximum burn-out to compensate for the extra heat. The modern method is to *make the lining thinnest at the point of maximum burn-out.* The result is less refractory loss, less flux and less bridging. This method sounds completely insane at first but experience has proved that refractory losses can be cut 40 per cent by what is called "contour" patching. The important point is not that this technique saves refractories and, therefore, cuts costs. The important factor is that less burn-out means more uniform and, therefore, better cupola operation. Better operation includes hotter iron, less bridging, less silicon and carbon loss, and longer care-free operation.

Prolong Lining Life

Maximum burn-out of a cupola patch occurs principally during two periods of the heat. If heavy patches of weak high-moisture muds are placed at the zone of maximum burn-out, most of the loss of lining will take place in the first hour. This is not a question of native refractoriness, it's a matter of expansion, contraction and green and dry strength. It is quite common to see such patches slough off and slide down over the tuyeres a short time after the wind goes on. Refractory loss per hour decreases during the heat until charging stops and then increases rapidly as the charge level falls. Some foundrymen keep the cupola full of coke after the last charge to prevent excessive erosion during the last hour. In every case, the flux should be decreased toward the end of the heat and discontinued on the last few charges to obtain maximum lining life.

One simple way to get started on contour patching is as follows: (1) Start with a new lining which is straight and of the desired diameter, except for an overhang immediately over the tuyeres. The cupola area at the overhang should not be less than 85 per cent of the area of the straight stack. In other words, do not use too much overhang. An excessive overhang will burn out faster than a minimum overhang. (2) Dry out the lining thoroughly. Slow heat for a long time is preferred. Air dry alone is of little value. (3) After the first heat on the new lining, any pockets, holes or irregularities should be filled to provide a smooth contour. (4) If the heat was relatively short, no further patch is required. It is merely necessary to measure the diameter at various levels, since all future patching should reproduce the shape determined by the first burn-out. (5) If the first heat resulted in a deep burn, some patch will be needed but the cupola should not be patched to the original shape. The important thing to remember is to patch to the shape determined by the burn-out and to follow the "natural contour." This is illustrated by Figs. 1, 2, 3 and 4.

If the cupola is used for short heats, the contour patch can be put in with inferior materials and still provide fair results. However, this practice is never as economical as putting the patch in carefully. For example, if a "mud" patch is used, it will fail quickly if over 2 inches thick. Therefore, poor patching can cause trouble and it is limited to a great extent in both life and quality operation. A poor patch may cause a poor operation even on a short heat. If good patches are used for short heats, they may be made to last two to three days without even chipping or repairing of the melting zone.

Favors Contour Lining

On long heats, good patching is essential but it will be found that a good contour patch will out-last either a "straight" patch or a "boshed-in" patch of the same quality and of the same materials. A contour patch will permit correct comparisons of refractory materials since it is less subject to variations in skill and workmanship.

Aside from the fact that it is much easier to follow a contour with monolithic materials than with set shapes and blocks, there are other advantages when the "muds" are properly prepared and properly applied. Monolithic patches contain no inherent cracks or joints and are not subjected to preferential slag attack. A good monolithic can be put in quicker and cheaper, particularly since the development of "air-placement" patching machines. Cracks, spalling, sliding and short life are not necessary with monolithics if as much thought is given to the preparation of the patch as is given to the preparation of molding sand. One would not expect to get a good casting from a molding sand with poor screen distribution, double the necessary amount of clay, triple the desired amount of water, low refractory bonds and high lime, low qual-

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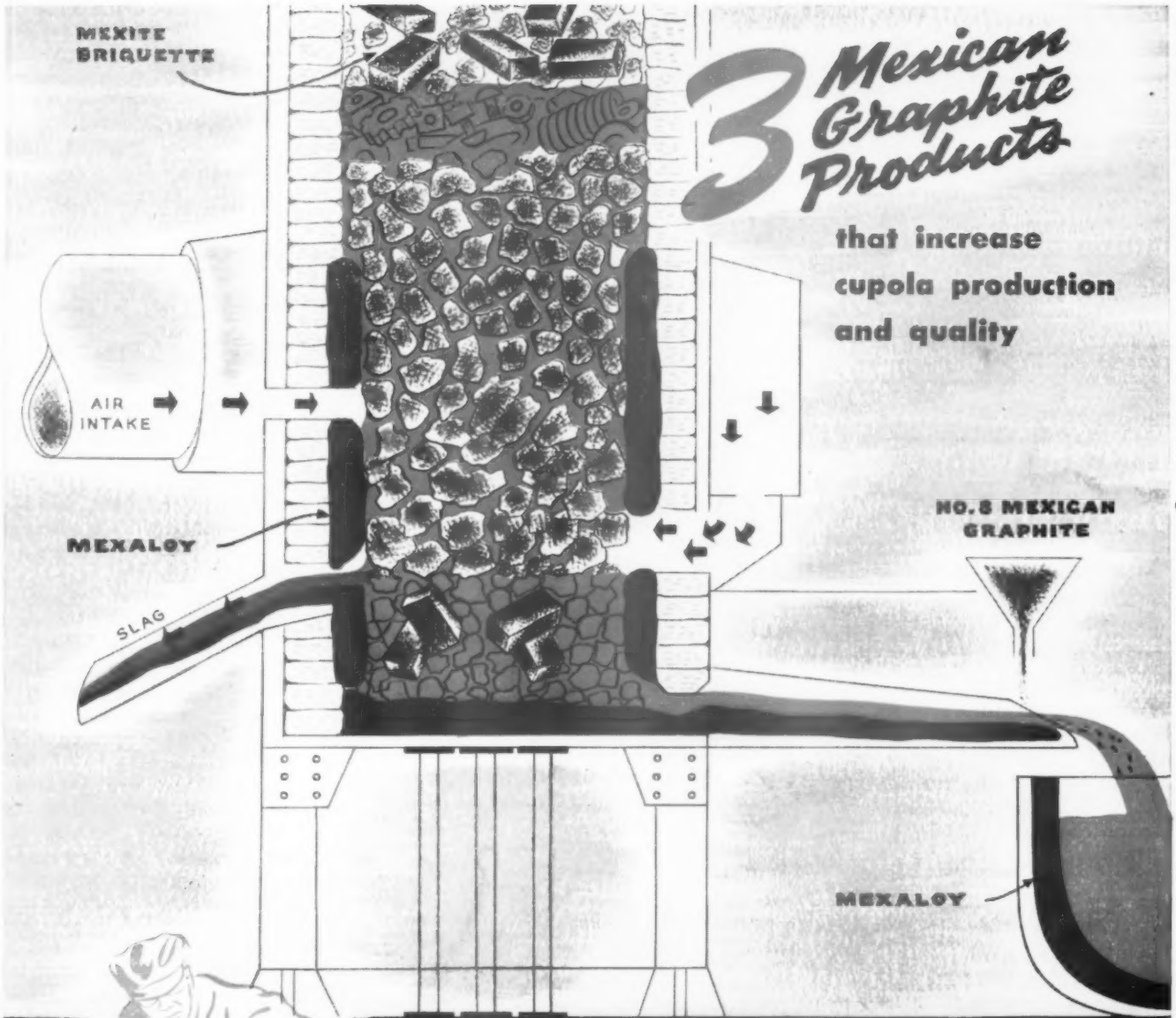

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MEXITE BRIQUETTES. One 4-lb. Mexite Briquette provides the same carbon content as 50 lbs. of pig iron when introduced into the cupola charge. Not only do Mexite briquettes sharply reduce melting costs per ton; they also reduce the range of carbon content fluctuation and give a steadier carbon analysis, a particularly vital factor when high percentages of steel are charged.

MEXALOY, applied to cupola linings, ladles, and spouts, resists molten metal and slag and keeps metal free from refractory inclusions. Its natural lubricating action provides low friction surfaces which part easily from metal and slag. A Mexaloy mixture is easily applied to any clean surface. Because it will not melt or change character under intense heat, Mexaloy gives longer refractory life with lower maintenance cost.

NO. 8 MEXICAN GRAPHITE is used for ladle additions to treat grey cast iron. Trickled into the cupola spout as metal falls into the ladle or with a direct ladle addition, it greatly reduces chill and hardness, producing castings of increased machineability. Normally only 2 lbs. of No. 8 need be added per ton of molten metal—a cost of only ten cents per ton—to assure castings which require no annealing. Write today for complete information on how Mexite Briquettes, Mexaloy, and No. 8 Mexican Graphite will give you better castings for less money.

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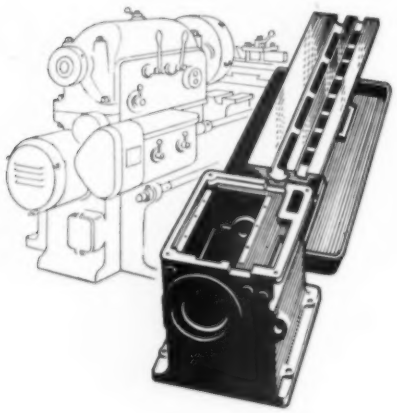

The basis of all other industries

Modern industries are founded upon the machine tool; no part can be made more accurately than the machine which makes it. A machine tool must be made accurate, and must stay so.

Requirements, then, of machine tool castings, are hardness enough to resist the wear of use, yet ready machinability in production, and dimensional stability over the years.

A typical successful lathe bed casting has 3.10% Total Carbon, 1.25% Silicon, 0.75% Manganese, with 0.50% Nickel and 0.50% Molybdenum added.

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(*Concluded from page* 258)

ity sand grains.

Foundrymen have a right to expect information on proper sizing of ganister, correct clay percentage, etc., if they in turn will use the materials with the correct amount of water properly tempered. For most hand-rammed ganister linings, a typical recommendation calls for 1 part coarse ganister (⅜ by ⅛), 1 part fine ganister (⅛ by down) and 1 part of high-refractory *plastic* fire clay. Only the best quality clay is economical for these applications. These mixes should be mixed or mulled with approximately 13 per cent water and allowed to age for 24 hours.

Ganister mixtures for gun or air-placement are being developed. Machine-patching permits dryer mixtures and eliminates ageing. Furthermore, the increased density and uniformity produced permit the use of better sizing of materials to advantage. The introduction of patching guns will undoubtedly bring improvements in both materials and techniques as a result of accurate research. At the present time best results are obtained with 3 parts of 3/16-by-down ganister and 1 part pulverized fireclay. Moisture is adjusted for best operation of the gun but is always much lower than hand-rammed linings.

Proper Drying Essential

In putting in any patch material, proper drying is essential. Lower moisture helps but good patching technique includes control of the drying cycle of the "light-up." The time from the "light-off" to "wind-on" should be as long as possible and absolutely uniform from day to day. The practice of rushing the burning of the bed on some days may damage the patch and cause a poor heat all day. Some foundries have gone to the "over-night light-up" with good results. In this technique the first half of the bed is lit and allowed to burn very slowly (no draft) all night. The second half of the bed is put in as usual in the morning. If properly handled, over-night light-up does not use an appreciable amount of coke and certainly provides a better refractory life and a better heat.

Once foundrymen appreciate the extent by which patching affects the cupola operation, this "step-child" of the cupola will start to make progress. We need to know more about some of the variables. We need machines and techniques to eliminate those variations which can overshadow the effect of the individual materials. Even if not troubled with bridging, temperature variations, analyses variations and other mysterious phenomena, the foundryman can still realize normal economies of operation from better patching. Cupola patching costs vary from 18 cents to $1 per ton of good castings. This is not an item to ignore.

PATTERNS, MOLDING METHODS FOR STEEL CASTINGS

(*Continued from page* 97)

the mold is filled, will float up into the ring-shaped head, and will not be caught and remain in the mold.

A modification of this method, sometimes used to mold large toothed gears, is to form the outside of the mold by means of a section of pattern bolted to the end of the sweep arm in such a way as to be readily detached, and making up perhaps 2 or 3 feet of the circumference, with the teeth on it. In making a mold by this method, a flat bed is first swept up as described above. The strike used for this purpose is then taken off the sweep arm, the segmental pattern is bolted in position on the end of the arm, and set in the desired location in the mold. Sand is rammed between the segmental pattern and the circular drag flask commonly employed for these jobs. At the bottom, of course, this sand is rammed against the swept bed. When this part of the face of the mold has been rammed, the pattern is unbolted from the arm and drawn away from the sand, leaving the latter in the desired shape. The arm is then moved to the next positon, the pattern reset and another part of the mold rammed.

Toothed gears of quite large diameter can be shaped in this manner, but it is difficult to secure very close location of the teeth. They may each be of the correct shape, but the last ones molded will seldom be quite accurately spaced with respect to those first rammed up. If the gear is to be used without machining, it is usually satisfactory, but when the teeth are to be finished with milling cutters, such a slight mislocation may greatly increase the machining costs. The cutter then takes a heavy cut on one tooth, and only just shaves its neighbor. The wear and tear on cutters in this case often makes it cheaper to cast the rim solid and cut the teeth out complete.

A somewhat similar use of a sweep

to form the inside part of the drag of a mold for a large cinder pot is shown in Figs. 58, 59 and 60. Cement-bonded sand was used in this job, and in Fig. 58 can be seen the lumps of old molds which form a large portion of the drag part of the mold. When facing sand is spread over this heap of rubble and backing sand, it is swept to the outline seen in Fig. 59 by means of the device shown in Fig. 58. In Fig. 60, some of the sections of the cheek flask are in place; these are sometimes rammed up and shaped by means of a sweep, or they can be rammed around a pattern. Fig. 61 shows the casting made in this mold.

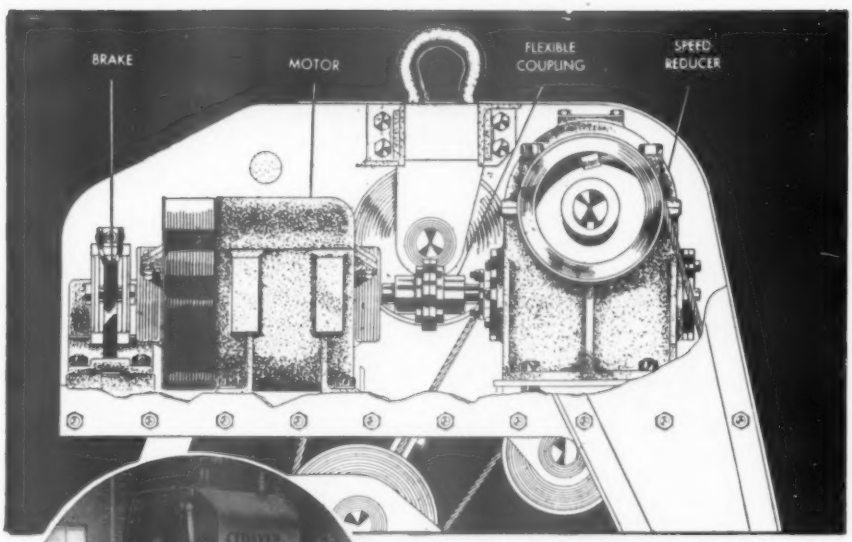
The use of a sweep to form the drag portion of a mold for a centrifugal pump impeller is illustrated in Figs. 62 to 67. The first view (Fig. 62) shows the sweep set ready to make the bed for the drag and the second (Fig. 63) the completed bed. The core, made in a separate box, is shown in place in Fig. 64; Figs. 65 and 66 show the setup to ram the cope over the top of the core and a wooden form, and the completed mold with heads and gate in place, ready to tie down, appears in Fig. 67. This job was made in cement-bonded sand.

Dry Cores on Inside

A mold for a large hydraulic turbine runner, made in cores set on a swept-up bed, is illustrated in Figs. 68 to 78. The first three of these views show the core arbor for the eight main cores required, Figs. 69 and 70 illustrating the method of forming the core around the arbor. In Fig. 71 two of the cores are shown in place of the swept bed, and in Fig. 72, the cores are all set, ready for insertion of a closing piece. Fig. 73 shows the skeleton box to make the central core in halves, Fig. 74 the central core itself, Fig. 75 the gate core used at the bottom of the mold.

In Fig. 76 the central core is shown in place, and in Fig. 77 the separately rammed cope has been set over the main cores and the whole assembly clamped down ready for pouring. The metal is carried down through a gate in the middle of the central core, out through the gates in the bottom gate core, and up four points into the lower part of the casting. Finally Fig. 78 shows the casting loaded ready for shipment.

Castings for use in the foundry, such as flask sections, cope bars or grids, and racks for the annealing furnaces, are sometimes made in "open sand" molds, which consist



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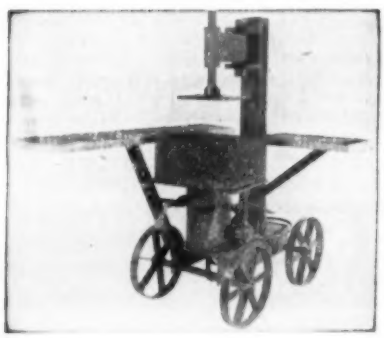

PORTABLE JOLT SQUEEZER R9X

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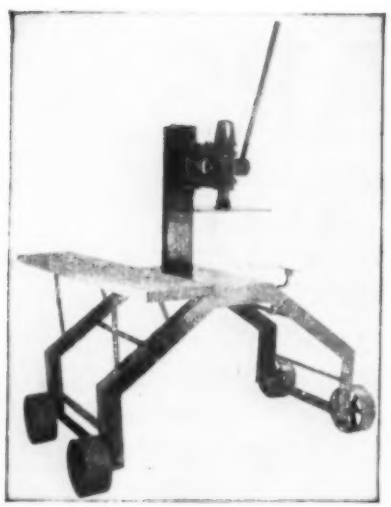

PORTABLE HAND SQUEEZER R-10

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Molding Machine Manufacturer for Over 20 years

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only of a drag. Since no cope is used, one side of the casting is uncovered, and the thickness of the piece depends upon how much metal is poured into the mold. As might be imagined, the face of the casting exposed to the air is exceedingly rough and irregular, and as no sink heads can be provided, there are usually a number of internal shrinkage cavities in pieces cast by this method. Only fairly thick sections can be made in open-sand molds, unless the total length is small, as it is hard to force steel to flow far through a thin section without overflowing the mold.

This practice is followed only for parts that do not have to be sound and smooth, or of a definite thickness. The reason for making open-sand molds in these cases, of course, is to save the expense of ramming up copes. Frequently no drag flask is used, the patterns being bedded into the foundry floor, sometimes merely by pounding them down into a swept-up bed of sand, and cutting by hand the necessary pouring basins and ingates at the ends of the pieces.

Molds Made By Hand

The foregoing discussion applies chiefly to cases where the molding is done by hand, either because the order is not large enough to justify mounting the patterns for machine work, or because they require larger flasks than the available molding machines can handle. When only a few castings are to be hand molded from a pattern, and the chances of receiving further orders for the piece are poor, only the cheapest materials are used, and the simplest possible pattern is made. It may even be advisable not to make a split pattern or to build a follow-board, but allow the molder to make up his mold by bedding in or by using a false cope.

Patterns which are to be used for making a large number of castings, and too large to be mounted for the available molding machines, are of course constructed from the best materials, and so built as to simplify the molder's task as much as possible. Quite often, as already mentioned, it is advisable to use split patterns, mounted or loose as seems most advantageous, or to furnish the molder with well built follow boards. or odd sides.

For the most part, of course, hand molding is used for heavy work, and on orders for only a few castings from a pattern. Even in very small steel foundries, repetitive work is made on molding machines. Technically there is nothing to prevent the production of such work by hand molding methods, using suitable patterns. Obviously, however, the economies possible with machine molding will generally be so great that orders for repetitive work will be secured only by shops equipped with machines large enough to handle it, and the foundries that mold entirely by hand will be unable to obtain the work at prices that will allow them to make a profit on it.

Sources of Illustrations

Birdsboro Steel Foundry & Machine Co., Figs. 53, 54, 58, 59, 60, 61, 62, 63, 64 65, 66, and 67.

General Steel Castings Co., Figs. 68, 69, 70, 71, 72, 73, 74, 75, 76, 77 and 78.

USE OF LITHIUM IN TREATING COPPER ALLOYS

(*Continued from page* 91)

per cent. The results obtained from the test bars were as follows: Tensile strength 39,800 psi, elongation 32.8 per cent. A very fine grain size resulted from this combination treatment, as may be seen in Fig. 5.

When working with this type of alloy the results of the tests indicate that for maximum physical properties a lithium addition of 0.01 per cent is sufficient; a larger addition will give a finer grain though with a reduction in the physical properties. With a prior addition of phosphorus the fine grain size may be obtained with no loss in physical properties.

88-8-4 G Metal—With this type of alloy it was desired to obtain a fine grain structure while maintaining maximum physical properties. A comparison standard containing 0.02 per cent P made in accordance with standard practice gave the following results: Tensile strength 46,150 psi, elongation 41.2 per cent. The grain structure, as shown in Fig. 6, was very coarse and unsatisfactory.

A melt was therefore made using a lithium addition of 0.01 per cent with no phosphorus. The physical properties obtained from the test bars were: Tensile strength 47,250 psi, elongation 39.5 per cent. As shown in Fig. 7, there is a marked improvement in the grain while the physical properties are maintained.

An additional test was then made without phosphorus and increasing the lithium addition to 0.02 per cent. The physical properties were somewhat improved showing: Tensile strength 47,900 psi, elongation 50.5 per cent. The grain structure was about the same as in the last test, as shown in Fig. 8.

Past experience with this type of

alloy had indicated that the addition of phosphorus prior to a lithium addition was not beneficial, but that excellent results could be obtained by a phosphorus addition following the lithium additon. A test was therefore made in which a lithium addition of 0.01 per cent was followed by a phosphorus addition of 0.02 per cent. The test bars from this melt showed the following properties: Tensile strength 48,500 psi, elongation 49.0 per cent. As shown in Fig. 9, the grain size, while not as fine as in Figs. 7 and 8, provides a decided improvement over that obtained without lithium treatment.

These tests indicate the advantage of lithium treatment for the tin bronzes in obtaining an improved grain structure combined with high physical properties.

Nickel Bronze—In order to determine if lithium could be satisfactorily used in the degasification of nickel bronze, in place of the customary treatment, a melt was made using an alloy containing 18 per cent nickel.

The metal was treated with 0.005 per cent of lithium and the results obtained were highly satisfactory. A dense fine grained metal was obtained, as shown in Fig. 10, and the physical properties obtained from the test bars were: Tensile strength 41,250 psi, elongation 16.0 per cent.

ASM Plans Congress and Exposition

Thirty-first annual meeting of the American Society for Metals, featuring the Metal Congress and Exposition, will be held Oct. 17-21 in the Public Auditorium at Cleveland. W. H. Eisenman, national secretary of the ASM and managing director of the Congress and Exposition, states that the show will require the entire space of both floors of the auditorium as well as all of the area underground, a total of 250,000 square feet. The Housing Bureau has been set up at 511 Terminal Tower, Cleveland 13.

Suggestion Plans

Employee suggestion plans of 45 companies engaged in both manufacturing and nonmanufacturing operations have been analyzed in the report, "Suggestion Plans for Employees," recently published by the Metropolitan Life Insurance Co. Copies may be obtained by addressing that company's Policyholders Service Bureau, 1 Madison Ave., New York 10.

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...TRADE PUBLICATIONS...

MAGNETS: Dings Magnetic Separator Co., 4708 West McGeogh Ave., Milwaukee 14—Bulletin B-1205A describing permanent plate magnets show how they can be installed in or above wood or metal chutes, ducts, pipes, hoppers, spouts, conveyor belts, feed tables and other places where extraction of tramp iron is necessary for protection against machinery damage, product contamination, fires and explosions. Bulletin B-1307A describes a magnetic sweeper for hand sweeping tramp iron and other magnetic materials from aisles, floors, yards, loading docks, and other areas.

TRANSFORMERS: Allis-Chalmers Mfg. Co., 1126 South 70th St., Milwaukee—Bulletin 61X7088 deals with the installation, care and operation of dry type transformers. Bulletin 61B6043A describes liquid filled transformers for all classes of service. These transformers use a noninflammable insulating liquid and are said to have the same electrical characteristics as equivalent ratings of the oil insulated type.

RESEARCH PAPERS: Silverstein & Pinsof Inc., 1720 Elston Ave., Chicago 22—Research papers are being offered to persons interested in analytical problems and procedures. Current paper deals with "Colorimetric Determination of Aluminum in Zinc Base Alloys."

METAL SPECIALTIES: Worthington Pump & Machinery Corp., 401 Worthington Ave., Harrison, N. J.—Bulletin W-350-B5B deals with valves, flanges, hose nipples, bars, welding electrodes and screw machine products manufactured from stainless alloy.

BAND SAWS: DoAll Co., 254 North Laurel Ave., Des Plaines, Ill.—Illustrated booklet describes the company's complete line of band sawing machines. Chart of specifications is included. Photos show technique used in cutting aluminum castings, iron castings, angle iron, wood and other materials.

PROJECTION MICROSCOPE: R. Y. Ferner Co., 110 Pleasant St., Boston 48—Illustrated booklet describes in detail a British-made projection microscope. Sections are devoted to a description of the various types of equipment used on the machine.

MOISTURE TESTER: Alpha-Lux Co., 155 Johns St.., New York 7—Bulletin AL-34 describes a moisture tester which may be used in the foundry field for testing sands, ganister, clays, oxides, refractory grogs and abrasives.

HEAT-TREAT FURNACES: Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44 — Catalog TB2-621 describes the triple-control method for heat-treatment which regulates atmosphere, rate of heating, and quench point to provide hardened steel of proper surface, shape and structure. It shows how the method may be modified for carburizing and gas cyaniding so that desired case depth is obtained.

MOTOR STARTERS: Allis-Chalmers Mfg. Co., 1126 South 70th St., Milwaukee — Bulletin 14B7132 describes alternating current full voltage starters to meet requirements of any type of motor drive. Construction features and uses of manual and magnetic across-the-line starters, across-the-line combination starters, reversing starters, and push-button control stations are described and illustrated.

BONDING MORTAR: Walsh Refractories Corp., Dept. M-1, 4070 North First St., St. Louis 7—Information sheet is offered on air setting high temperature bonding mortar for use in laying and surfacing fire brick and tile in boilers and furnaces.

FLOOR TRUCKS: Rapids-Standard Co., 342 Rapistan Bldg., Dept. T-294, Grand Rapids 2, Mich.—Illustrated bulletin TR-848 describes the company's line of floor trucks. Specification tables list platform sizes, model numbers, types of wheels and casters used, carrying capacities and weights.

TESTER: W. C. Dillon & Co., 5410 West Harrison St., Chicago 44—Bulletin describes portable instrument for testing materials of tensile strength from a few pounds to 160,000 psi. Illustrations show the instrument's construction for tensile, compression, transverse and shear testing.

CENTRIFUGAL CASTING: Lebanon Steel Foundry, First Ave. & Lehman St., Lebanon, Pa.—Booklet provides detailed information on a new process of centrifugal casting in permanent molds. The illustrated booklet is intended to serve as a useful data reference source for executives, engineers and designers.

SNOW LOADER: Barber-Greene Co., Aurora, Ill.—Illustrated brochure describes controls, operating features and principles of the company's snow loader which is said to be convertible to a bucket loader for bulk materials during other seasons of the year. Booklet contains information indicating the equipment can pay for itself in one year.

ARC WELDERS: Metal & Thermit Corp., 120 Broadway, New York 5—Circular contains prices and complete specifications on the company's line of arc welding machines. Company also offers a magazine entitled *Welding Briefs* which contains articles describing the use of its machines or electrodes in various industries.

PNEUMATIC CONVEYING: Convair Corp., 1501 Potomac Ave., Pittsburgh 16—Bulletin 102 describes and illustrates a number of the company's pneumatic conveying system installa-

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tions. These systems are designed to convey materials both hot and cold, wet and dry, at rates of ounces or tons per minute, using air, gas or steam. Pipes from ¼-in. to 36 in. in diam have been used.

GAS BURNERS: Bryant Heater Co., Industrial Division, 1020 London Rd., Cleveland—Bulletin 7C describes packaged industrial gas burner assemblies complete with pressure blowers. Capacities, specifications, dimensions and alternative assemblies are described for the units which are adaptable for installations where open burners with controlled flames are suitable.

BOILER PROTECTION: Dampney Co. of America, 1243 River Rd., Hyde Park, Boston 36—Bulletin 1530 describes a protective surfacing material for boilers and for power and processing equipment in similar wet-heat service. It also provides application data, with information on special equipment for the internal coating of boiler, water-wall, and economizer tubes.

MAGNETS: Ohio Electric Mfg. Co., 5900 Maurice Ave., Cleveland 4—Bulletin F-2001 provides information on the application, construction, selection and suspension of separation and road sweeping magnets. It contains data on field attraction and penetration, magnet dimensions, weights and lifting capacities of circular and rectangular separation magnets.

MATERIALS HANDLING: Towmotor Corp., 1226 East 152nd St., Cleveland 10 — Booklet describes a movie offered by the company, showing materials handling processes in a number of manufacturing concerns, including foundries. Booklet is illustrated with typical views from the picture.

GRINDERS: Buehler Ltd., 165 West Wacker Dr., Chicago 1—Bulletin describes the company's line of wet and dry grinders and belt surfacers. A page is devoted to a description of a line of equipment for metallurgical laboratories.

AIR COMPRESSOR LUBRICATION: Petroleum Advisers Inc., 60 Wall Tower, New York 5—Booklet deals with some of the principles of air compression, describes various air compressors and discusses the lubrication of compressors.

ZINC DIE CASTINGS: New Jersey Zinc Co., 160 Front St., New York 7—Booklet contains 266 illustrations depicting the use of zinc die castings in the assembly of 167 different products in ten major consuming fields.

DIAMOND TOOLS: Diamonds & Tools Inc., 19345 John R. St., Detroit 3—Leaflet illustrates, describes and lists prices of the company's line of diamond dressing tools.

CRANES: Thew Shovel Co., 28th & Fulton Sts., Lorain, O.—Bulletin illustrates 48 applications of self-propelled cranes for industrial material handling and construction operations.

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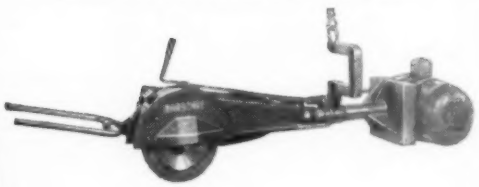

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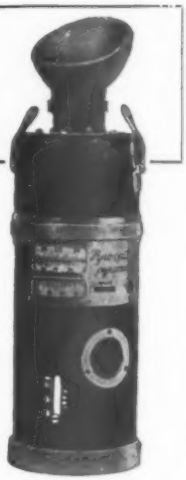

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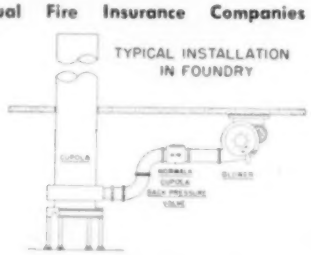

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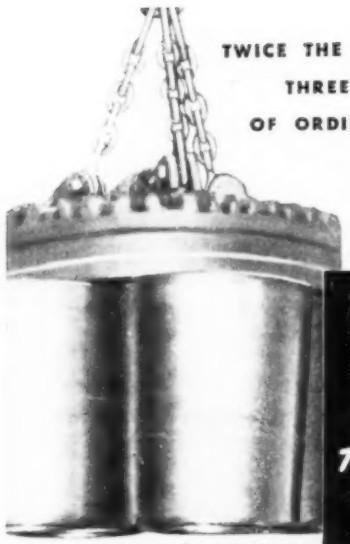


TWICE THE STRENGTH—
THREE TIMES THE LIFE
OF ORDINARY MAGNET CHAIN!

T-M
ALLOY STEEL
TRIPLE MAGNET CHAIN

Patent No. 2315146

TM Triple Magnet Chain has twice the strength and three times the life of ordinary magnet chain. Patented design of the connecting links eliminates kinking and twisting — the cause for excessive wear in end links and connecting links of ordinary magnet chain assemblies. These qualities, plus its resistance to shock, grain growth and work-hardness, assure TM chain users of long, dependable service. For complete information and specifications write the S. G. Taylor Chain Company, 44 141st St., Hammond, Ind.

TAYLOR MADE *Chain*

75th ANNIVERSARY

MANUFACTURERS OF BBB, PROOF COIL, HI-TEST AND STEEL LOADING CHAIN

IT'S NEW—IT'S SENSATIONAL

AMASTEEL
TRUALLOY SHOT

LASTS MANY TIMES LONGER

Here is the peak efficiency in shot for BLAST CLEANING and PEENING.

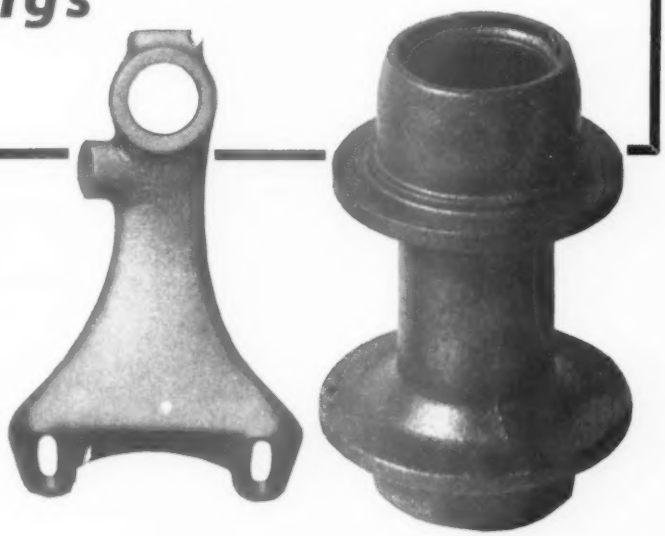
AMASTEEL is much better than hard iron or malleable abrasives.

Investigate AMASTEEL Shot today. It lasts six times as long!

PRODUCERS OF
PEENBLAST
CLEANBLAST
ALLOY 99

ALLOY METAL ABRASIVE CO.
311 WEST HURON ST. ANN ARBOR, MICH.

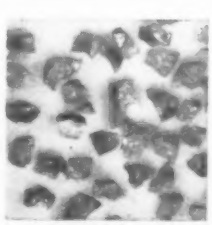
Only Clean Castings Pay Off!



Casting profits come only at the shipping room door. Every reject, sent back for re-cleaning piles up costs, cuts profit. Only hard-hitting, fast-acting, thorough cleaning grit does the kind of a job that insures clean castings in a "one pass" operation.

That's why so many Foundries use Controlled Grit. They've found that its sharp edges and heavy bodies hit harder, clean faster, show lower month-in-month-out cleaning costs.

Get full information on Controlled Grit for your cleaning operations.



Controlled Grit, magnified 16 times. Note the many sharp edges, the heavy, chunky bodies. That's why Controlled Grit hits harder, cleans faster, cuts costs by lasting longer.

Now Being Manufactured By

National Metal Abrasive Co.
Cleveland, Ohio

Western Metal Abrasives Co.
Chicago Heights, Ill.

MEMBER
MANUFACTURERS' ASSOCIATION INC. FOUNDRY EQUIPMENT

Sold Exclusively By

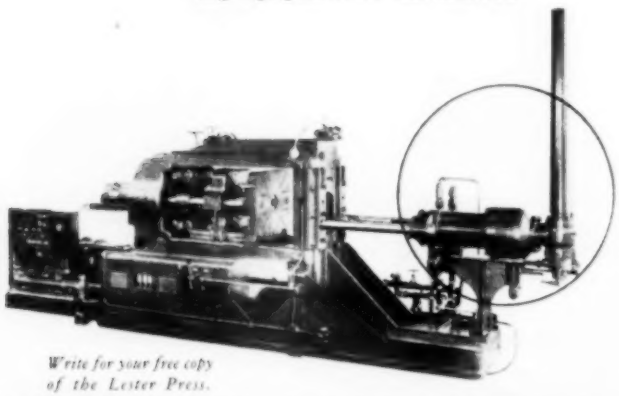
Hickman-Williams & Co. Inc.
CLEVELAND NEW YORK INDIANAPOLIS CHICAGO PITTSBURGH
CINCINNATI ST. LOUIS PHILADELPHIA DETROIT

DOLLARS ARE MADE OF PENNIES

If every person in the United States gave you a penny, you'd have over $1,500,000. Only a penny—but it's the volume that counts. And it's volume that makes each one of the features on Lester-Phoenix machines so valuable.

Take the Prefill Injection System of die casting aluminum, for example. It delivers a surge of pressure at the end of a high speed stroke, packing in the metal to reduce porosity, increasing the strength of the parts, filling castings otherwise impossible to make and, most important, providing UNIFORMITY of plunger speed and pressure. That means you can figure not only how many castings you will make, but also how many castings you will keep. When you cut down rejects in volume, you shave pennies from the part price and put dollars in your pocket.

That's why Lester-Phoenix offers every proven cost saving feature. Add them up and the total is the finest die casting equipment on the market.



Write for your free copy of the Lester Press.

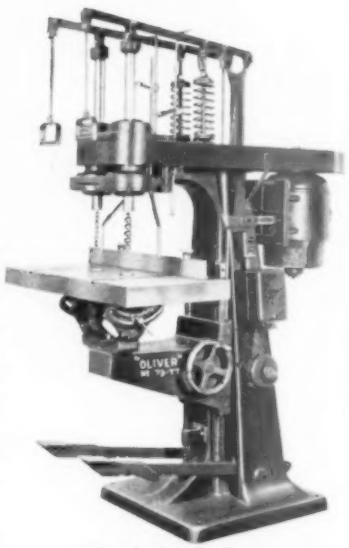
LESTER-PHOENIX
DIE CASTING MACHINES

Distributed by **LESTER-PHOENIX, INC.**
2659 CHURCH AVE., CLEVELAND 13, OHIO

"Oliver" Vertical Borer

Double and Single Spindle

For large patterns... bores holes up to 3" diameter, 12" deep, to the center of 36"



This new "Oliver" has two independent spindles for boring two sizes of holes. A one-piece column has wide ways for knee. Table is 18" x 30" with 17" vertical adjustment. Table tilts 40° to and from column, 15° to right and left. Graduated rockers indicate angle. Spindles have extra large ball bearings. Smooth, quiet V-belt drive. Various speeds available. Also offered as a Single Spindle Borer. *Write for Bulletin No. 73-TT.*

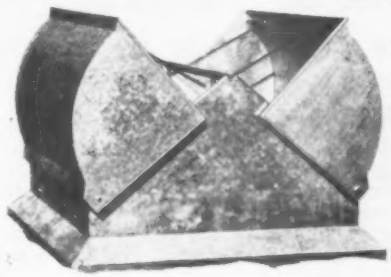
(Double Spindle Borer illustrated)

"Oliver" has a full line of boring machines for pattern makers. If you have an unusual boring, milling or routing problem, let our engineers help you solve it.

OLIVER MACHINERY COMPANY
Grand Rapids 2, Michigan

LOOK AT
WELLMAN
Some pattern prices meet other prices but quality is always worth more. There is a difference in pattern equipment.
PATTERNS
You are cordially invited to inspect our facilities to produce Well-made patterns, or write the address below. Complete layout and checking service on sample castings.
WELL-CAST MAGNESIUM, ALUMINUM AND BRONZE CASTINGS
WELLMAN
BRONZE & ALUMINUM COMPANY
2502 EAST 93rd STREET • CLEVELAND, OHIO

Foundries use Ject-O-Valve for quick removal of heat and fumes



Powerful Swartwout Ventilator solves fresh air problems

Overcome employee "griping" about fumes and heat. Install Swartwout Ject-O-Valve Roof Ventilators to push smoke, fumes, excess heat out of your foundry. The powerful blast from these well-built "straight-through" type ventilators sweeps aside all weather, carries contaminated air well above your buildings.

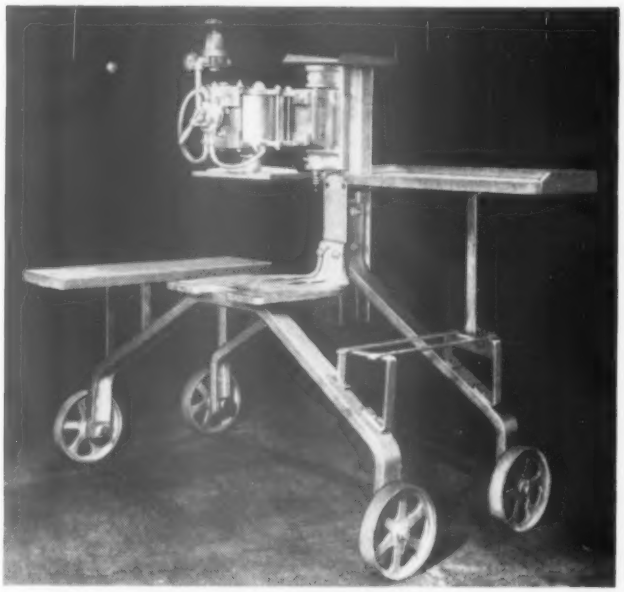
In operation, the air stream from a scientifically designed propeller fan opens top sections, holds them open while fan is operating. Top closes automatically — weather tight — when ventilator is not in use. Ject-O-Valve is made in five sizes, 28 different capacities. Various foundry operations can be served separately with appropriate Ject-O-Valves for each.

Write for Ject-O-Valve folder and prices.

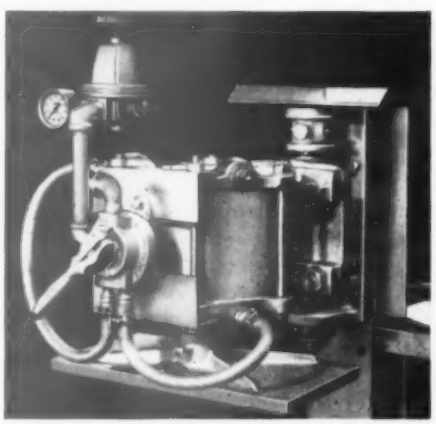
THE SWARTWOUT COMPANY
18566 Euclid Avenue . . . Cleveland 12, Ohio

Swartwout *Controlled* **Air Circulation**
EQUIPMENT FOR EFFECTIVE ECONOMICAL VENTILATION OF INDUSTRIAL BUILDINGS

GET FASTER, EASIER PRODUCTION WITH A NEW MOLINE 55 AIR SQUEEZE MOLDING MACHINE



MOLINE 55 MOLDING MACHINE WITH PNEUMATIC HANNIFIN CYLINDER



CLOSE UP VIEW OF HANNIFIN PNEUMATIC CYLINDER

The new 55 heavy duty portable features a pneumatic cylinder for smooth, full power performance. Air replaces muscle enabling a molder to put up more molds faster and with less fatigue. Larger flasks and heavier jobs can be handled more effectively. The new 55 increases production and lowers foundry costs. It is ruggedly constructed for heavy duty and designed for smooth, simple, economical operation. Molders like them!

OVER SEVENTY YEARS OF SERVICE

WRITE FOR FURTHER INFORMATION AND PRICES

WE SHIP QUICK

MIW

LADLES

ALL CAPACITIES • ALL TYPES

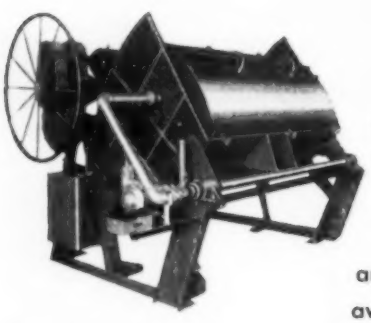
Including Timken worm geared Ladles with *Industrial's* patented distortion-proof, self-locking design

BOWLS

PRESSED STEEL
WELDED STEEL
RIVETED STEEL

Including

flat bottom, round bottom, and teapot spout types



SPECIAL EQUIPMENT

Special geared motor-driven mixing ladle, an example of custom-build pouring and handling equipment available at INDUSTRIAL

SHANKS, TONGS, BAILS and CUPOLA EQUIPMENT in ALL TYPES

Industrial
EQUIPMENT COMPANY
115 N. OHIO ST. MINSTER 2, OHIO

LATEST CATALOG AVAILABLE

Quick-As-Wink

HAND OPERATED

Control Valves

For single and double acting air cylinders

● Widely used on machines and machinery of all kinds. Operating parts are in pressure balance eliminating any tendency to creep or crawl. The U-shaped packers are expanded by pressure and seal tightly avoiding leakage. There is no lapping – no grinding – no metal-to-metal seating. Built with stainless steel bodies and bronze sleeves. Sizes up to 1½ inch. 2, 3 and 4 way, regular and three position designs providing neutral and compound exhaust. For air up to 125 lbs. pressure and 150°F.

Send for a catalog today—and get full details about the complete line.

Manufactured by **C. B. HUNT & SON, INC.,** *Salem, Ohio*

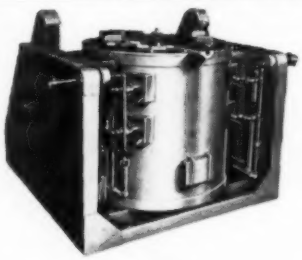
ENGINEERING AND SALES REPRESENTATIVES IN THE PRINCIPAL CITIES

NON-FERROUS METAL MELTING FURNACES

SELECTION TABLE

	TYPE	Max. Temp.	Series	Recommended for	Bulletin No.
TILTING	CRUCIBLE	2500°F.	TCR	Melting Brass and Copper	TC-45
		1400°F.	TCA	Melting Aluminum	TC-45
	POT	1400°F.	TP	Melting Aluminum and Magnesium	TP-45
STATIONARY	CRUCIBLE	2500°F.	CR	Melting Brass and Copper	CR-45
		1400°F.	AC	Melting Aluminum	AC-45
	POT	1400°F.	AM	Melting Aluminum	AM-45
		1200°F.	SM	Melting Soft Metals	AM-45
		1000°F.	SA SAV	Melting Soft Metals	SV-45

26348



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'Surface' *Standard Rated* **FURNACES**

SURFACE COMBUSTION CORPORATION, TOLEDO 1, OHIO

To help solve your Core Production Problems

1. UNIFORM QUALITY

Our rigid raw material specifications, "lab" controlled processing, plus constant vigilance from original inspection to final shipment, assure uniform quality of Dayton Core Oil.

2. TECHNICAL ASSISTANCE

To assure your getting the proper oil for every job, allow our experienced engineers to assist you with your core room problems.

3. LABORATORY ANALYSIS

Twenty-eight years of experience in the core oil field and continual laboratory research for the properties required in quality core oils enable us to manufacture the oil best suited to your needs.

SALES ENGINEERS: G. R. Sager, E. Jesse James, Dayton, Ohio; E. G. Allen, Coldwater, Mich.; E. E. Hook, Syracuse, N. Y., Fred Clark, Illinois, Thomas H. Beaulac, Franklin, Penna.

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"ASK THE MEN WHO USE IT"

Look to DAYTON CORE OIL

- PRODUCE BETTER CORES
- AT LOWER OVER-ALL COST
- CLEANER, MORE UNIFORM CASTINGS

Also DOCO BINDER & CORE PASTE • DOCO STEEL CORE AND MOLD WASH

★ Sharper Castings

★ Greater Brinell Hardness

★ Increase Tensile Strength

★ Increase Transverse Strength

★ Increase Wear Resistance

★ Increase Heat Resistance

Copper Shot

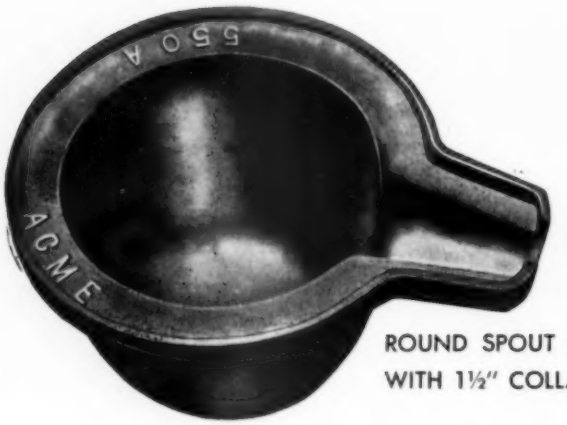
IMPROVES YOUR IRON

ALTER COMPANY Fifty Years of Service

1702 Rockingham Road, Davenport, Iowa

MELTING POTS—Ingot Molds

for ALUMINUM AND OTHER NONFERROUS METALS. 45 SIZES.



ROUND SPOUT POT NO. 550A
WITH 1½" COLLAR ON FLANGE

INGOT MOLD NO. AA-6

WRITE
for CATALOG "F"

HOLDING BOWL
NO. HP7001

Made of Acme SPECIAL-M-Heat Resisting Iron
— They Stand the Heat!

ACME FOUNDRY COMPANY
2502 22nd Street **DETROIT 16, MICH.** *Phone:* Tashmoo 5-2404

A BLAST FURNACE PRODUCT

Smelted from Superior quality lake ores, high grade metallurgical coke and limestone, using our own local No. 1 Sharon Seam coal.

HIGH SILICON IRON JISCO

A "blend" with JISCO is sound metallurgy.

THE JACKSON IRON & STEEL *Company*
JACKSON, OHIO

WITH
DRAVO *Counterflo* HEATERS

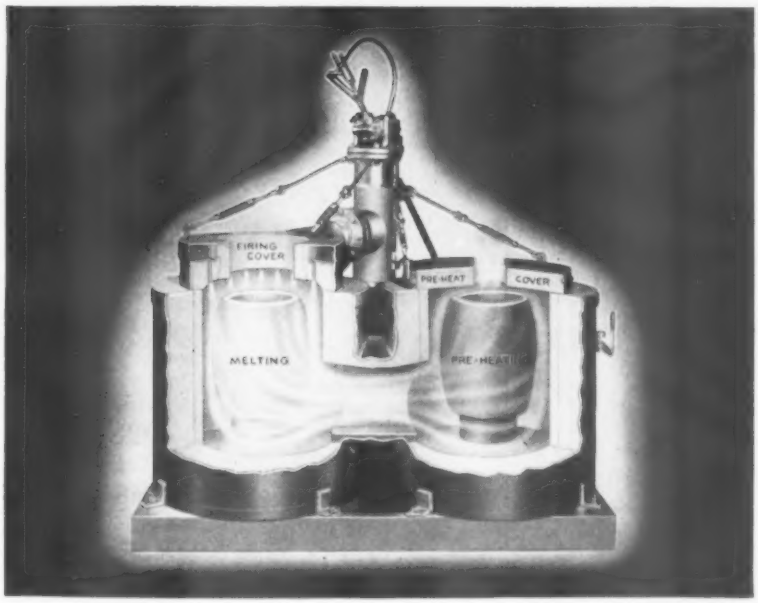
You do only HALF the job of foundry ventilating when you exhaust smoke, fumes and airborne dust. Do a 100% job by supplying clean, fresh, tempered replacement air with Dravo *Counterflo* Heaters. These same units will provide ample plant ventilation in summer.

Gas or oil-fired . . . readily converted from one to the other. Stainless steel combustion chamber. Up to 22,000 CFM air-handling capacity per unit. Directs warm air to the working zone without drafts. Easily installed—only power line, fuel pipe and stack required. Floor, wall or ceiling mounting. *Greater employee comfort means greater production.* Write for Bulletin LX-523.

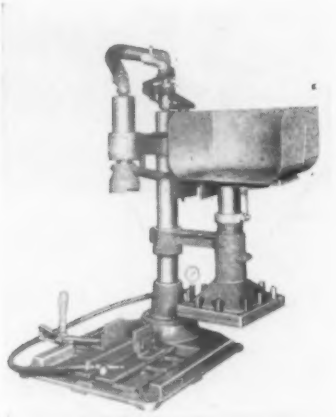
DRAVO CORPORATION
DRAVO BUILDING, PITTSBURGH 22, PA.
Sales Representatives in Principal Cities

DRAVO

FOR *Cost-Conscious* FOUNDRIES!



The Randall-Twin crucible furnace, while melting one pot, preheats a second by using the heat that is wasted in a furnace of conventional design. You save space, fuel, reduce melting time, lower crucible wear and get a better metal.

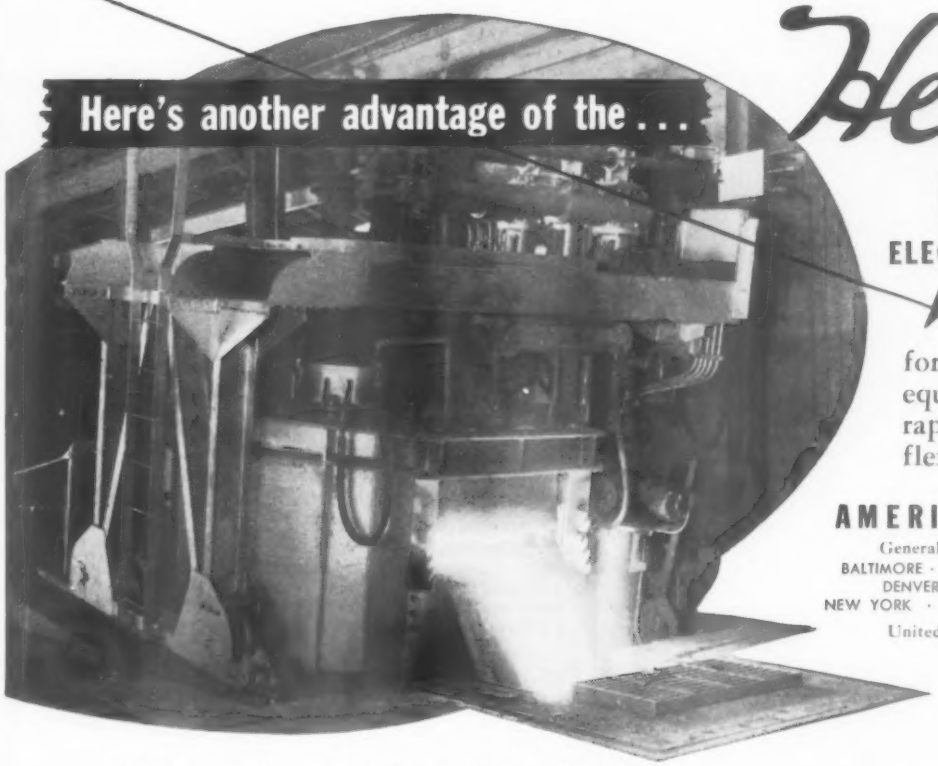


The Randall Model B Core Blower is a bench-type blower that is unbelievably fast and easy to operate. Clamps and blows horizontal boxes with a single motion. Experienced operators not required. Write for our new circular, just off the press.

The Randall-Twin gives you more heat at less cost! Write for our new circular

THE *Randall* FOUNDRY EQUIPMENT CORPORATION
4600 EAST 71st STREET • CLEVELAND 5, OHIO

Here's another advantage of the . . .



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GANTRY-TYPE
ELECTRIC MELTING FURNACE

High powered transformers and modern control equipment are supplied for rapid melting, maximum flexibility and efficiency.

AMERICAN BRIDGE COMPANY
General Offices: *Frick Building, Pittsburgh, Pa.*
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United States Steel Export Company, New York

Write for your free copy of the new Heroult Catalog.

AMERICAN BRIDGE COMPANY · USS Heroult FURNACES · UNITED STATES STEEL

UNITED STATES STEEL

"Here's an easier way to cure these defects in iron castings without remelting!"

BLOWHOLES
LOCALIZED POROSITY
CRACKS
CORE SLIPS
PATTERN-ERRORS

If your castings are in sound condition generally, you can quickly and permanently cure them of many minor troubles . . . with NI-ROD* Electrodes for machinable welds in cast iron.

Ni-Rod's deposits are easy to make and easy to machine. Here's how they can help you to save time . . . and lots of extra labor when you meet the following common defects:

Blowholes. Chip out the blowhole and fill it with a bead or two of Ni-Rod. Preheating is not necessary because the iron won't get too hot while the small deposit is being made.

Localized Porosity. Chip away the porous area until sound metal is found at all boundaries of the area. Then fill with a deposit of Ni-Rod.

Cracks. Small and shallow cracks should first be Vee'd out. They can then be quickly and smoothly welded with Ni-Rod and machine finished.

Core Slips. Badly formed or off-center casting holes can often be "adjusted" back to position by grinding out one side and building up the other with Ni-Rod.

Pattern Errors. Castings which are slightly off specified tolerances, due to pattern errors, can frequently be corrected and built up to size with smooth-welding Ni-Rod.

You'll like Ni-Rod's easy machinability. It's difficult to detect any difference in machining characteristics between the Ni-Rod deposits and the cast iron.

Also, Ni-Rod welds closely match the color of cast iron.

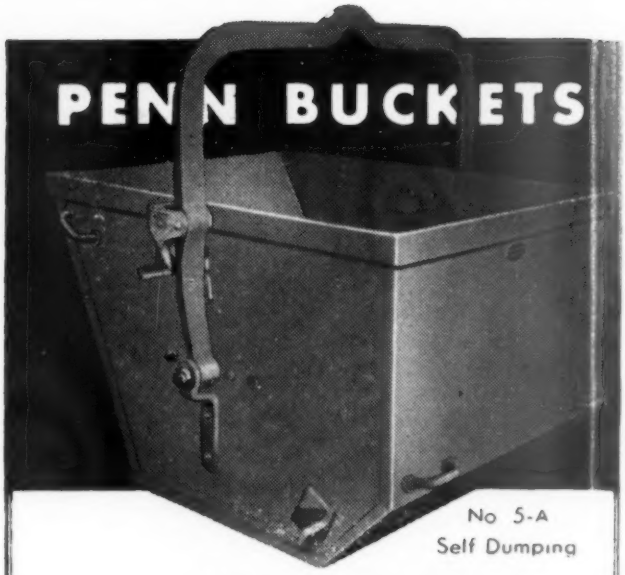
Thorough fusion with the base metal is still another Ni-Rod advantage. No cracks at the fusion zone . . . no definite line of separation.

Your nearest INCO distributor has Ni-Rod in 3/32", 1/8", 5/32", and 3/16" diameters. Order a 5-lb. package today. *Reg. U.S. Pat. Off.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.

SEND FOR INSTRUCTION BOOKLET

PENN BUCKETS



No 5-A
Self Dumping

Careful balancing makes Penn Buckets self dumping when loaded and self righting when empty. Welded construction prevents "clinging" makes them empty easily and completely.

MEMBER

WRITE TODAY FOR NEW BULLETIN DIMENSION SHEET AND PRICE LIST

PENN IRON WORKS
READING, PENNA.

IMMEDIATE FUSION WITH MOLTEN METAL PREVENTS LEAKS

Buffalo *"LEEK-PRUF"* CHAPLETS

In both Double (shown) and Single Head types of "Buffalo" *LEEK-PRUF* Chaplets, the chief factor of efficiency is the exclusive fin design.

Integral with the stem, this extremely thin section protrudes to its full width. There is no recess in the stem to cause weakness. The advantages of this original fin design speak for themselves.

- Positive fusion with molten metal—no chance for leakage.
- Burns in more easily.
- Does not chill molten metal.
- Stem is always full size—hence stronger.

CATALOG NO. 15
Complete information, full range of sizes, on double and single head (round or square) chaplets, as well as many other types.

MAILED ON REQUEST

Trial samples of any chaplets furnished without charge.

Combined **SUPPLY & EQUIPMENT CO., INC.**
211 CHANDLER ST., BUFFALO 7, N. Y.

ACCEPTED

BY AMERICA'S LARGEST INDUSTRIAL PLANTS TO DO THE TOUGHEST BLASTING AND PEENING OPERATIONS

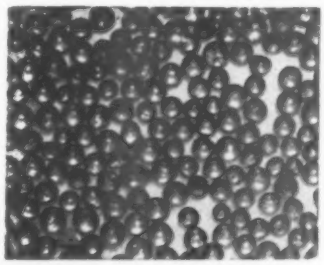
HI-GRADE METALLIC SHOT AND GRIT

FAMOUS

FOR ITS ABILITY TO STAND UP UNDER REPEATED HARD USE

- ROUND
- UNIFORM IN SIZE
- UNIFORM IN HARDNESS
- LACKS IRREGULAR SHAPES

- RECTANGULAR
- SHARP
- TOUGH
- DURABLE



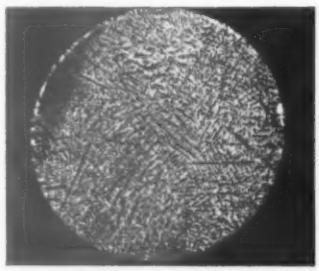
UNRETOUCHED PHOTO OF HI-GRADE SHOT

CLAYTON-SHERMAN ABRASIVES COMPANY

3896 LONYO ROAD

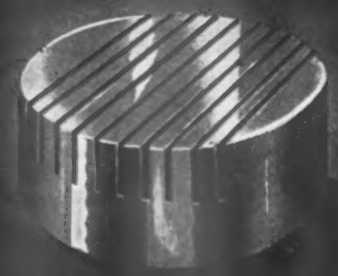
DETROIT 10, MICHIGAN

CEdar 7200



MICROSCOPIC STRUCTURE OF METAL

Precision



CORE BOX VENTS

Here's part of a complete line of DEMMLER core box vents—rigidly constructed in varying sizes of slotted brass—slotted steel—and screen mesh. Orders filled promptly from stock.

BRASS SLOTTED CORE BOX VENTS

Slot widths: .010", .013", .015"
Diameters: 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", 3/4", 7/8", 1", 1 1/4", 1 1/2"

STEEL SLOTTED CORE BOX VENTS

Slot widths: .010", .013", .015"
Diameters: 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", 3/4", 7/8", 1", 1 1/4", 1 1/2"

SCREEN TYPE CORE BOX VENTS

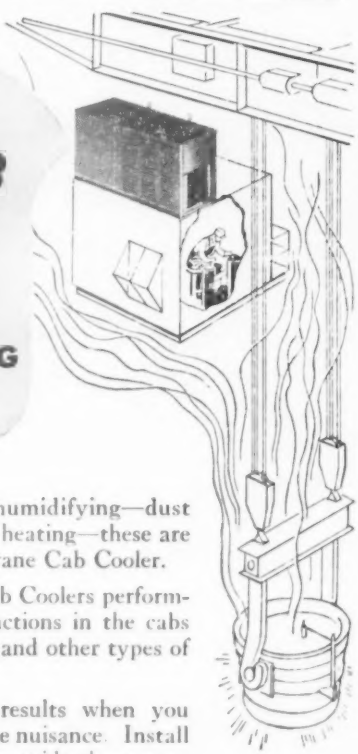
Mesh: #30, #40, #50.
Diameters: 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", 3/4", 7/8", 1", 1 1/4", 1 1/2"

SPECIFICATION CIRCULAR ON REQUEST

Wm. DEMMLER *& Bros.*
Kewanee, Illinois

DRAVO CRANE CAB COOLERS

PERFORM EVERY AIR CONDITIONING FUNCTION



Cooling—fume removal—dehumidifying—dust filtering—ventilating—winter heating—these are the functions of the Dravo Crane Cab Cooler.

You will find Dravo Crane Cab Coolers performing these air conditioning functions in the cabs of soaking pit, ladle, stripper, and other types of hot-metal cranes.

And you will observe real results when you eliminate heat fatigue and fume nuisance. Install Dravo Crane Cab Coolers to provide these comfortable working conditions in the cabs of hot-metal cranes.

DRAVO CORPORATION

PITTSBURGH · PHILADELPHIA · CLEVELAND · NEW YORK
CHICAGO · DETROIT · ATLANTA · BOSTON

Sales Representatives in Principal Cities

DRAVO

GLUTRIN
LIQUID BINDER

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For

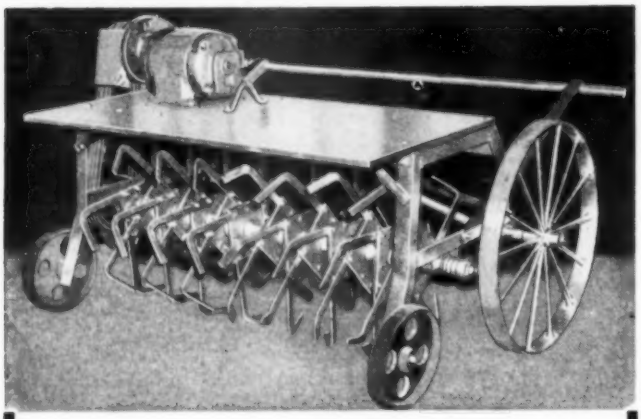
CORE WORK, SAND FACINGS, SPRAYS

Write for pamphlets giving detailed information. Both materials carried in stock by America's foremost foundry jobbers

Robeson Process Company
(Established 1905)

American Gum Products Co.
(Established 1915)

GENERAL OFFICES: 500 FIFTH AVENUE • NEW YORK 18, N. Y.



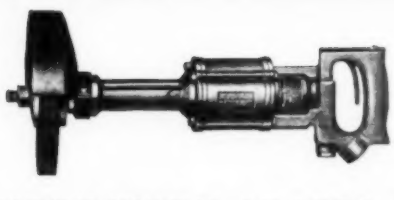
MORE PROFITS
FROM S & B SANDCUTTERS

One Foundry reports "savings of $7,000 in labor per year." S & B Sandcutters pay for themselves in short time. They do complete job cutting, mixing, and aerating with sizes to fit your need. Write for Free Folder.

S&B SANDCUTTERS

SATHER MANUFACTURING CO., INC.
3330 McDougall Everett, Wash.

Master Power
HARD CHROMED • PORTABLE PNEUMATIC TOOLS



DO MORE WORK AT LESS COST
because they deliver more power per cubic foot of air consumed, are light in weight for easier maneuverability and they retain their new tool power longer.

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because they are lighter in weight, better balanced and designed to reduce shock and be free from vibration.

IF YOUR PROBLEM INCLUDES
chipping, ramming, grinding, buffing, sanding or wire brushing, *write us today for full particulars.*

THE MASTER PNEUMATIC TOOL COMPANY, INC.
ORWELL, OHIO • U. S. A.
SALES • SERVICE • STOCK • COAST TO COAST

Better testing equipment

to improve your products

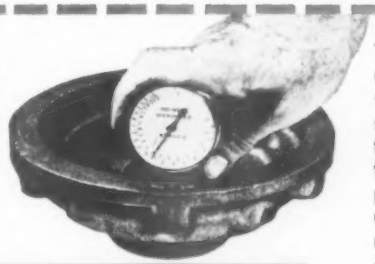
Compare the prices shown here with those currently quoted for other units of test equipment designed for the same general purposes. These prices are not only lower but the performance of Dietert control equipment is in every case equal to or superior to any other units available.

With the Dietert Carbon Determinator, you can run ACCURATE quantitative carbon tests on metals or other materials in the short space of two minutes.

The PRICE is $235.00

The Dietert Sulfur Determinator provides you with the means of getting the sulfur content of metals and other materials with precision. The equipment and the analytical procedure meets the tentative ASTM Standards for the determination of sulfur in steels.

The PRICE is $153.00



The Dietert Brinell Hardness Reader can be used successfully by any one in your plant who can read a dial. No judgment is necessary, no charts or tables to consult and no figuring to do. It makes hardness testing foolproof. The Brinell Hardness Reader replaces the measuring microscope. It measures the depth of the Brinell impression rather than the diameter. The dial is graduated in Brinell Hardness Numbers.

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5199

We will rush detailed specifications to you on these units if you will write to Department 7.

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CONTROL EQUIPMENT • SAND • MOLD • MOISTURE • CARBON • SULFUR

"Does the Jobs We Require... BETTER"

...of December 29, 1941.
We operate a sizeable foundry and use Smooth-On in rectifying minor errors in castings. We have found that Smooth-On No. 4A does the job we require better than anything we have yet used.

(from a foundry operator)

Leading foundrymen for years have used Smooth-On No. 4 Foundry Cement to correct surface blemishes in castings. Unavoidable sand holes, blow holes, pock marks, contour dents, etc., are evened up easily, with a metal surface that matches the casting's color and texture and may be filed smooth. And Smooth-On stays firmly in place, because it expands slightly as it hardens.

You have a choice of three shades. For light gray castings and polished surfaces, Smooth-On No. 4AA, which will take machining. For medium gray castings, No. 4A. For dark gray, coarser-grained castings, No. 4B. If your supply house hasn't Smooth-On Foundry Cements, write us. Working samples sent on request. SO-274

FREE 40-Page Handbook

Shows repairs made with Smooth-On Foundry Cement and many other original plant and home repairs made with other Smooth-On Cements — cracks sealed, leaks stopped, loose parts tightened. 170 illustrations. Free, simply write us.

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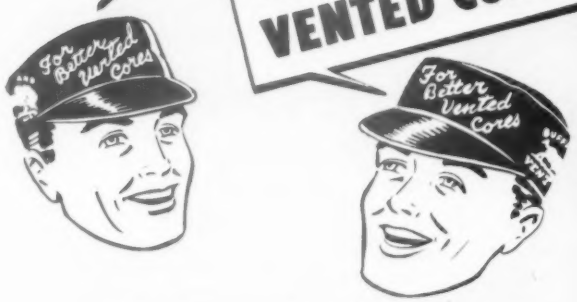
570 Communipaw Ave., Jersey City 4, N. J.

Do it with **SMOOTH-ON**
FOUNDRY CEMENT

Buffalo Brand VENT WAX

FOR BETTER VENTED CORES



Why chance costly casting losses when foundry-proven Buffalo Brand Vent Wax can give you quick safe core venting for even the most difficult castings.

Made in two shapes . . . 18 sizes. Send for generous sample.

UNITED COMPOUND CO.
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The Favorite Blades of Non-Ferrous Foundries for Over 20 Years

You will profit by using the tougher Atlantic blades for clean, speedy cutting of gates and risers from castings. You can eliminate unnecessary grinding operations—our specially milled tooth construction makes it easier to cut closer to the body of the casting. All Atlantic Metal Cutting Band Saws are guaranteed as to material, workmanship and temper.

Send for Atlantic Band Saw Catalog,
describing foundry cut-off operations.

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Exclusively Band Saw Production

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HAMILTON SPRAY GUN

COMPLETE
WITH 4½ FT. SUCTION HOSE
AND SINKER

$10.00

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For spraying molds and cores with any liquid. For cleaning electric motors, gasoline motors and machinery. For laying dust.

Neoprene disc valve. Trigger control. Sturdy brass construction. Length overall 6½". Weight without suction hose and sinker 18 oz. Two nozzle sizes, ⅛" and ¼". Literature on request.

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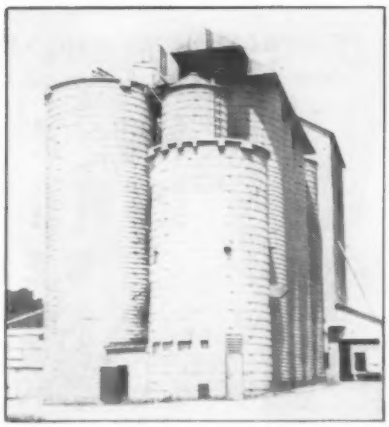
Moisture Elimination Up To 3000 Pounds Per Square Inch

FAST
IN TWO SENSES



Because the Super-Concrete Staves lay up readily, Neff & Fry Storage Bins are erected fast; i.e., in a comparatively short time.

The staves interlock together firmly. The tiers are securely bound with heavy galvanized steel rings. The materials are enduring. So Neff & Fry Bins stand fast; i.e., ruggedly, for a long time.

Experience over a period of almost 30 years proves that Neff & Fry Super-Concrete Stave Storage Bins serve from one generation to the next with virtually no upkeep cost. Many of the leading manufacturing, processing, mining, quarrying, distributing, and transportation companies of the country will testify that this is true.

We'll gladly give you the evidence. Get it before you contract for storage bins. Write, wire, or phone us.

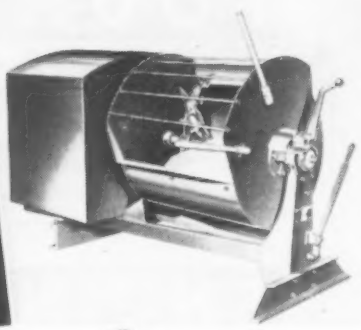
NEFF & FRY STORAGE BINS

FOR ALL SORTS OF BULK FLOWABLE MATERIALS

THE NEFF & FRY CO., Camden, Ohio

CMC

WONDER *Sand* MIXERS



New Mixing Efficiency

EXCLUSIVE TRIPLE MIXING HOES . . .

Tops in the field! Triple mixing Hoes have adjustable blades . . . easily set for correct clearance. Mixing is *thorough* and "end to end". Advance CMC design makes charging and discharging *easier than ever before!* 6 cu. ft. capacity shown. Write today for full details.

RENEWABLE DRUM LINES

Easily, replaceable full-hard abrasion resistant alloy steel drum liners are your assurance of lowest upkeep and minimum operating costs.

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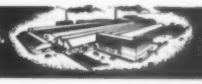
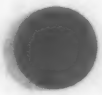
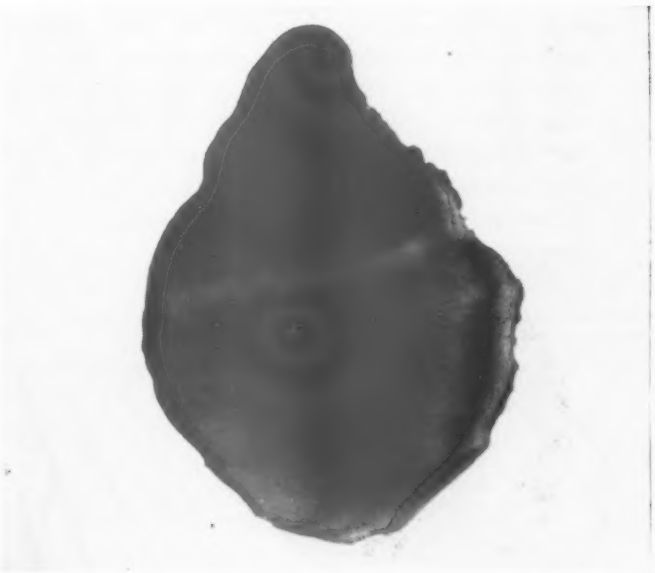


Here's what happens to fuel oil sludge



when HOUGHTO-SOLV hits it!



Unretouched photo of speedy action of HOUGHTO-SOLV attacking a drop of sludge, dissolving it instantly.

HOUGHTO-SOLV is Houghton's proven additive for treatment of fuel oil systems to remove sludge by taking it into solution and actually making it burnable. Here are the advantages of such treatment: 1. No costly manual cleaning of systems is necessary. 2. Tanks, lines, pumps, strainers and nozzles stay clean. 3. Soot formation minimized. 4. Steady, efficient heating assured. 5. Non-corrosive to metal parts. 6. Safe, easy and economical to use.

HOUGHTO-SOLV costs only a tiny fraction of a cent per gallon of fuel oil. It helps any grade, whether or not pre-heaters are used.

It is shipped in 55-gal., 30-gal. or 5 gal. containers from our Philadelphia, Cleveland, Chicago, Detroit or San Francisco plants. Place a trial order today and see for yourself the amazing results.

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POWERMATIC

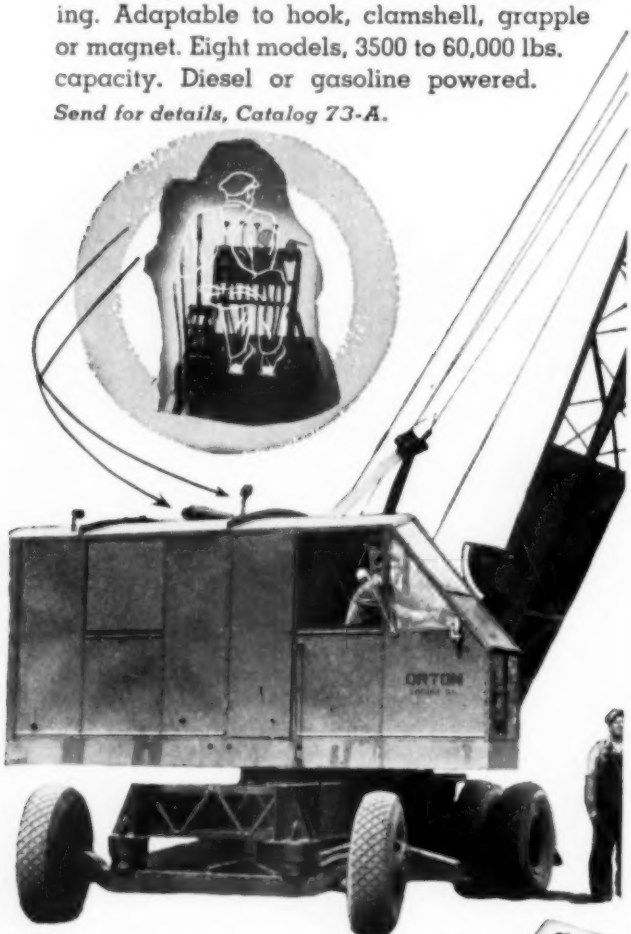
AIR-CONTROL

AERO-CRANE

No afternoon *fatigue let-down!*

One man, with the Powermatic Air-Control Orton Aero-Crane loads and unloads cars and trucks, gets material onto the stockpile and off with *early morning efficiency* all day. High mobility job to job. Full-view cab. Full circle turn-table. Anti-friction bearings. Non-burn Orcoin V-type clutches. Orton SAFETY engineering. Adaptable to hook, clamshell, grapple or magnet. Eight models, 3500 to 60,000 lbs. capacity. Diesel or gasoline powered.

Send for details, Catalog 73-A.



Long-life Orton Aero-Crane has most rigid car body of any crane built. Goes anywhere a truck will go. One man does the work of four handling yard jobs that eat up the time of a crew.

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DOUBLE YOUR PRODUCTION—with the fastest and most powerful Rammer made—

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Have been adopted as standard by some of the largest users of Rammers throughout the Country. MADE IN FIVE SIZES. Send for Bulletin No. 300.

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ENGINEERS

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OIL BURNERS

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Single and double burner equipments in 4 sizes. Write for Catalog 1043 on ladles, heaters, mold dryers, cupola lighters.

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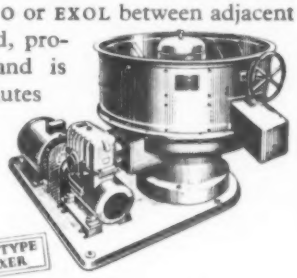
OIL-SAND MIXING TECHNIQUE *is vital to good work in the foundry.* With the modern range of GLYSO products — semi-solids, creams, PERMOL and EXOL cereal binders —green bond and dry strengths of an oil-sand can be controlled between very wide limits. But the mixer must develop the full green bond inherent in a semi-solid compound; it must not crush the sand or a dangerous reduction in permeability may result. What is needed is the swift, silent and efficient FORDATH New Type MIXER, which rubs the sand and compound against inclined ribs in the mixing chamber, and promotes a vigorous tumbling action. Each grain of sand is coated with a film of binder, capillary action draws the oil in the GLYSO or EXOL between adjacent grains; and a thoroughly mixed, properly aerated charge of oil-sand is cleanly discharged after 2 to 3 minutes mixing. Five models, capacities 20 lbs. to 1 ton, with drive, gears and bearings fully enclosed and lubricated.



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FORDATH IN THE FOUNDRY

Full details from

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A SPECIFIC TYPE FOR EVERY CORE BOX

CORE BOX VENTS

SLOTTED OR SCREEN

DEEP HEAD Wide or Narrow Slots .014 .010

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We stock sizes from ⅛" to 1¼" dia. in 1/16" steps.

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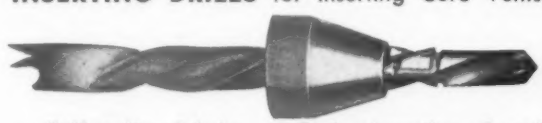

• Uniformity of holes • Faster insertion of vent • Correct Depth

VENT CLEANER for cleaning slots

MADE OF TEMPERED STEEL, EASY TO USE

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1930— First commercial use of gamma rays; radiograph made of sternpost of cruiser "Chester".

1935— First purchase of radium for industrial radiography by Westinghouse; bought from Radium Chemical Co., Inc.

1938— AFA questionnaire revealed that 8% of steel casting men used radium radiography.

1941— 22% of steel casting men bought, rented, leased or employed radium for radiographic purposes.

1946— 150 steel foundries rented or leased radium.

1948— 200 steel foundries rented or leased radium.

The swing to radium radiography is not accidental: it is a deliberate move by steel casting people who want to improve their production and effect economies. The apparatus is absurdly simple, requires no special training to operate, and, most important, involves no capital expenditure. Illustration shows a large number of castings being radiographed simultaneously. The apparatus may be bought, leased or rented. This is a sound, commercial proposition, and you really owe it to yourself to investigate our claims. Write today for additional information.

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PORTABILITY
SIMPLICITY OF OPERATION
SIMPLE APPARATUS
MAY BE BOUGHT,
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Low Temperature **EUTECTIC** WELDRODS

"Eutectic Low Temperature Weldrods" solve salvage problems the modern way by reclaiming castings at low heat — avoiding distortion, stress, warping, and machining difficulties.

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Insures maximum density and minimum gas content

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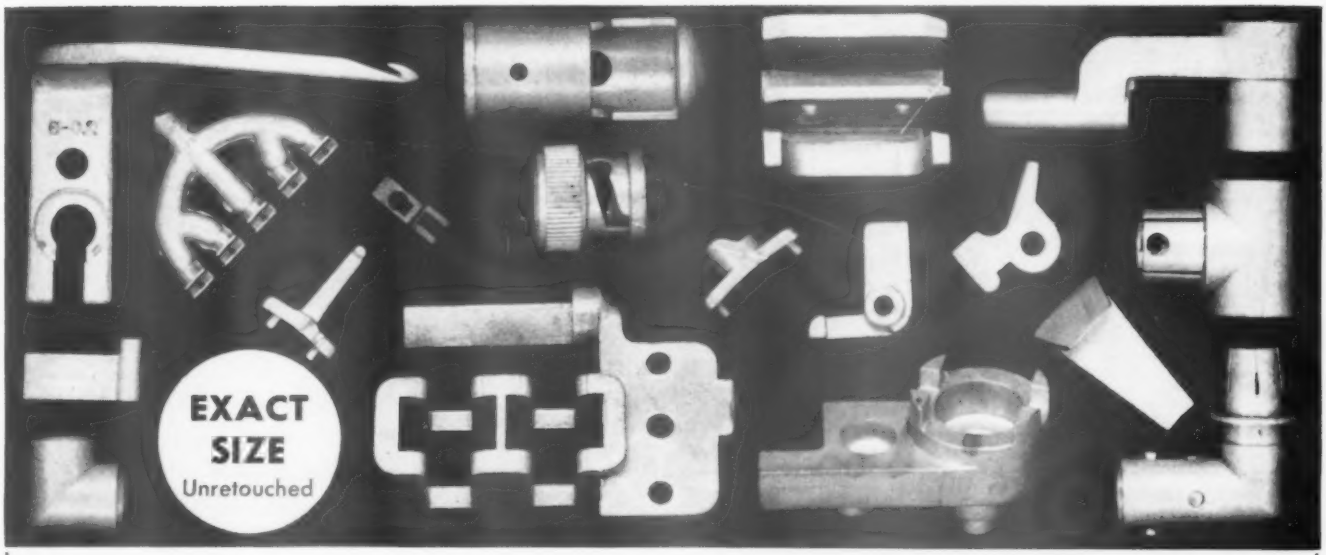

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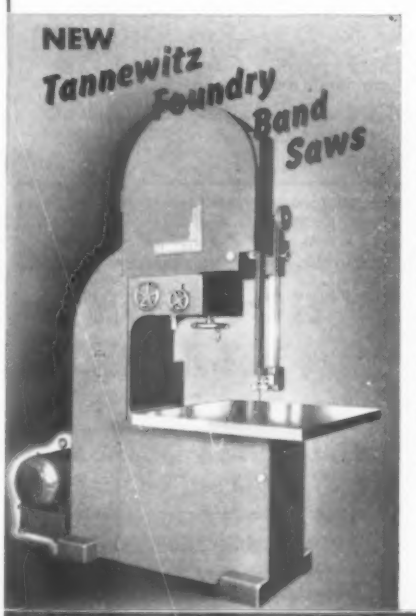
The NEW, FASTER, BETTER WAY *to Cut off* HEAVY GATES *and* SPRUES

Here's a machine with which you can trim off the heaviest risers and sprues from aluminum and magnesium castings in far less time than usual.



Specially built to withstand the severe conditions of foundry use and give you years of absolutely trouble-free service. All steel; all ball bearing; with constant tension device to overcome elongation of blades under heavy cuts, and many other outstanding features. Requires very, very little maintenance. Will pay for itself in short order. Write now for the facts!

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ONE OF THE NATION'S
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ESTABLISHED 1866
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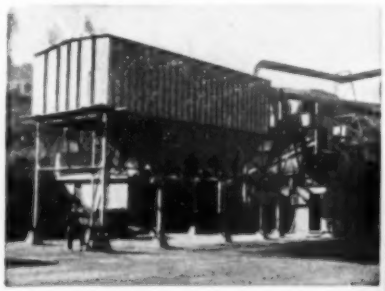

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Reasonable Delivery.

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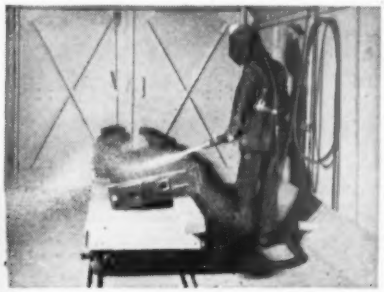

Parsons blast rooms, suction cabinets, oscillating blast barrels and accessories, do the job faster . . . better. Custom built to give year after year service, and trouble-free operation.

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Step up your production at the grinding wheel with these quality built dressers of patented design. Spindle, bearings and sleeve in cutters eliminate wobble and wear. Star cutters in Nos. 0, 1, and 2 dressers are milled and heat-treated, have uniform, sharp teeth. Corrugated steel cutters are optional for Nos. 1 and 2. Heavy duty model No. 3 has hard iron cutters. Write Dept. F today for free data.

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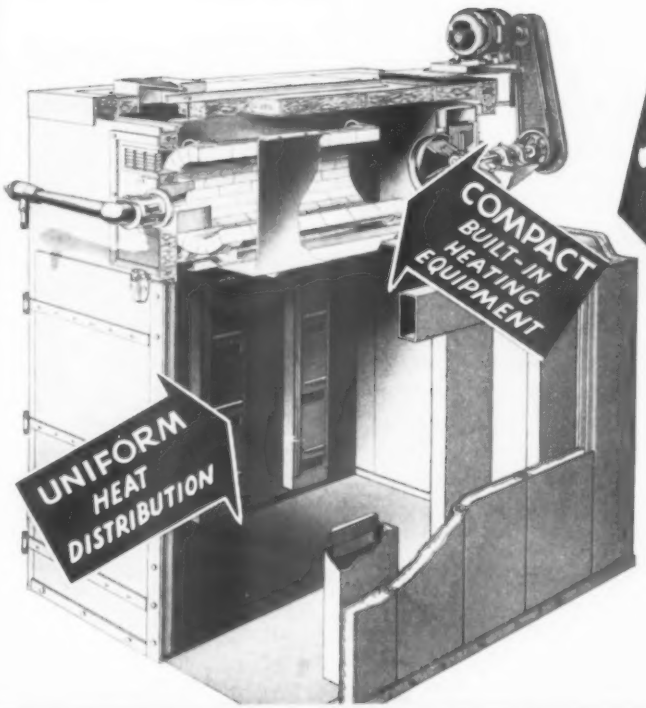

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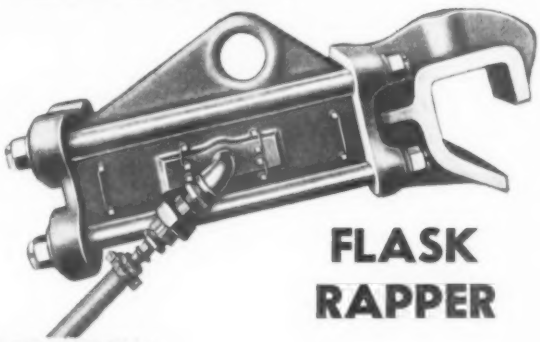

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Hydro-Blast Corp., 2550 N. Western Ave., Chicago 47, Ill.
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Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

CLUTCHES (Magnetic)

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Stearns Magnetic Mfg. Co., 622 S. 28th St., Milwuakee 4, Wis.

COAL STORAGE BINS

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COKE (Foundry)

DeBardeleben Coal Corp., 2201 First Ave., N., Birmingham 3, Ala.
Hickman-Williams & Co., Union Commerce Bldg., Cleveland 14, O.
Pickands, Mather & Co., Cleveland 14, O.
Republic Coal & Coke Co., 8 So. Michigan Ave., Chicago 3, Ill.
Semet-Solvay Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.
Tennessee Products & Chemical Corp., American National Bank Bldg., Nashville 3, Tenn.

COKE (Petroleum)

Republic Coal and Coke Co., 8 S. Michigan Ave., Chicago 3, Ill.

COLLECTORS (Dust)

American Wheelabrator & Eqiupment Co., Mishawaka, Ind.
American Air Filter Co., 266 Central Ave., Louisville 8, Ky.
Bartlett & Snow, C. O. Co., 6201 Harvard Ave., Cleveland, O.
Kirk & Blum Mfg. Co., Cincinnati 25, O.
Pangborn Corp., Hagerstown, Md.
Parsons Engineering Corp., 2545 E. 79th St., Cleveland 4, O.
Schneible Co., Claude B., 2827-25th St., Detroit 16, Mich.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

COMBUSTION EQUIPMENT

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Neff & Fry Co., Camden, O.

CONTROL SYSTEMS (Dust)

American Air Filter Co., 223 Central Ave., Louisville, Ky.
American Wheelabrator & Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Pangborn Corp., Hagerstown, Md.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

CONVERTER BLOWERS

Roots-Connersville Blower Corp., Connersville, Ind.

CONVERTERS (Bessemer)

Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

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Giffels & Valet, Inc., Marquette Bldg., Detroit, Mich.
Lester B. Knight & Associates, Inc., 600 West Jackson Blvd., Chicago 3, Ill.
Palmer-Bee Co., Westminster & G. T. R.R., Detroit 12, Mich.

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CONVEYORS (Belt)

Beardsley & Piper Co., The, 2424 No. Cicero, Chicago 39, Ill.
Bartlett & Snow Co., C. O., 6201 Harvard Ave., Cleveland 5, O.
Chain Belt Co., 1671 W. Bruce St., Milwaukee 4, Wis.
Imperial Belting Co., 1800 So. Kilbourn Ave., Chicago 23, Ill.
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Joy Mfg. Co., Joy Division, Pittsburgh, Pa.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Logan Co., 580 Cabel, Louisville, Ky.
Mathews Conveyer Co., Ellwood City, Pa.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Robins Conveyors Div., Hewitt-Robins Inc., 270 Passaic Ave., Passaic, N. J.
Standard Conveyor Co., North St. Paul 9, Minn.

CONVEYORS (Chain)

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Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus 16, O.
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Mathews Conveyer Co., Ellwood City, Pa.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Palmer-Bee Co., Westminster & G. T. R.R., Detroit 12, Mich.
Standard Conveyor Co., North St. Paul 9, Minn.

CONVEYORS (Magnetic)

Stearns Magnetic Mfg. Co., 662 S. 28th St., Milwaukee 4, Wis.

CONVEYORS (Monorail)

American Monorail Co., 13104 Athens Ave., Cleveland 7, O.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 E. 283rd St., Wickliffe, O.
Link-Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Mathews Conveyor Co., 104 Tenth St., Ellwood City, Pa.
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Penn Iron Works, Reading, Pa.

CONVEYORS (Overhead)

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Ohio Ferro-Alloys Corp., Canton 2, O.
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VENTILATING SYSTEMS (Cont'd.)

W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland 2, O.
Westinghouse Electric Corp., B. F. Sturtevant Div., 40 Wall St., New York 4, N. Y.

VENTS (Core Box)

Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Demmler & Bros., Wm., Kewanee, Ill.
C. M. Smillie & Co., 1100 Woodward Hgts. Blvd., Ferndale, Mich.

VIBRATION REDUCTION PADS

Fabreeka Products, Inc., 222B Summer St., Boston, Mass.

VIBRATORS

Adams Co., Dubuque, Iowa.
Beardsley & Piper Co., 2424 No. Cicero, Chicago 39, Ill.
Cannon Vibrator Co., 111 Power Ave., Cleveland 14, Ohio.
Cleveland Vibrator Co., 2828 Clinton Ave., W., Cleveland 13, Ohio.
Davenport Machine & Foundry Co., Davenport, Iowa.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Foundry Service Co., Birmingham, Ala.
Foundry Supplies & Mfg. Co., 2221 Orchard St., Chicago 14, Ill.
Freeman Supply Co., 1152 Broadway, Toledo 5, O.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
Link Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Martin Engineering Co., Kewanee, Ill.
Milwauke Foundry Equipment Co., 3238 W. Pierce St., Milwaukee, Wis.
New Haven Vibrator Co., 131 Chestnut St., New Haven 7, Conn.
Nichols Co., Wm. H., Richmond Hill, Long Island 18, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
S P O Incorporated, 7500 Grand Division Ave., Cleveland 5, O.
Syntron Company, Homer City, Pa.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

VIBRATORS (Core Bench)

Cleveland Vibrator Co., 2828 Clinton Ave., W., Cleveland 13, Ohio.

VISES (Air Operated)

Van Products Co., Erie, Pa.

WASH ROOM EQUIPMENT

Bradley Washfountain Co., Box 732, Milwaukee 1, Wis.

WAX (Core, Vent, Pattern)

United Compound Co., Inc., 328 South Park Ave., Buffalo 4, N. Y.

WEDGES (Foundry)

Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwauke 14, Wis.

WELDING GAS

Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.

WELDING APPARATUS (Electric Arc)

Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.

WELDING and CUTTING APPARATUS and SUPPLIES

Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.

WELDING ELECTRODES (Carbon)

National Carbon Co., Carbon Products Div., 30 E. 42nd St., New York 17, N. Y.

WELDING RODS & ELECTRODES

Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
Eutectic Welding Alloys Inc., 40 Worth St., New York 13, N. Y.
International Nickel Co., Inc., 67 Wall St., New York 5, N. Y.
Linde Air Prdoucts Co., 30 E. 42nd St., New York 17, N. Y.

WHEELBARROWS

Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

WHEELS, ABRASIVE (Cut-off)

Bay State Abrasive Products Co., Westboro, Mass.
Carborundum Co., Perth Amboy, N. J.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Independent Pneumatic Tool Co., Aurora, Ill.
Norton Compfany, Worcester 6, Mass.
Peninsular Grinding Wheel Co., 729 Meldrum Ave., Detroit, Mich.
Raybestos-Manhattan, Inc., Manhattan Rubber Division, Passaic, N. J.
Simonds Abrasive Co., Tacony & Fraley Sts., Philadelphia 37, Pa.
Sterling Grinding Wheel Division, Cleveland Quarries Co., Tiffin, Ohio.

WHEELS (Wire)

Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.

WIRE BENDERS

Redford Iron & Equipment Co., 20733 Glendale Ave., Detroit 23, Mich.

WIRE BRUSHES

Indpendent Pneumatic Tool Co., Aurora, Ill.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.

WIRE CUTTERS

Federal Foundry Supply Co., 4600 East 71st St., Cleveland 5, Ohio
Redford Iron & Equipment Co., 20733 Glendale Ave., Detroit 23, Mich.

WOODWORKING MACHINERY

DoAll Company, Des Plaines, Ill.
Freeman Supply Co., 1152 Broadway, Toledo 5, O.
Oliver Machinery Co., Grand Rapids 2, Mich.

X-RAY EQUIPMENT

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
General Electric X-Ray Corp., 4855 West McGeoch Ave., Milwaukee 14, Wis.

X-RAY FILMS

Eastman Kodak Co., Rochester, N. Y.
General Electric X-Ray Corp., 4855 West McGeoch Ave., Milwaukee 14, Wis.

ZINC

Federated Metals Div. American Smelting and Refining Co., 120 Broadway, New York 5, N. Y.

—When writing advertisers, please mention THE FOUNDRY—

Classified Advertising

Help Wanted

PATTERNMAKER

Old established North Carolina machinery manufacturer has opening for man experienced in making from blueprints all types and sizes of patterns for cast iron foundry. Write giving experience, age, references and hourly rate—also send snapshot. Address: Box 412, The FOUNDRY, Cleveland 13, Ohio.

SALES REPRESENTATIVE

Or foundry supply house to handle the sale of metal abrasives in the States of Washington, Oregon and Montana. Address: Box 414, The FOUNDRY, Cleveland 13, Ohio.

METALLURGIST

Midwest acid electric steel foundry. Successful applicant must have thorough technical as well as practical knowledge, possess initiative and be capable of assuming full responsibility for quality control. State full work and personal information, also salary expected. Replies held confidential. Address: Box 427, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY METALLURGIST

Prominent supplier of raw material for grey iron foundries has an opening for an experienced foundry metallurgist with headquarters at Detroit. Write giving personal and business experience. Address: Box 417, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY FOREMAN

Experienced, production and jobbing aluminum and bronze foundry. 10 to 12 molder shop. Ability to handle men important. Location New York City. State experience, age, reference, salary expected. Address: Box 415, The FOUNDRY, Cleveland 13, Ohio.

WORKING CORE ROOM FOREMAN

For Southern foundry. Must be familiar with sand mixing and all phases of core blowing. Steady work, good working conditions and wages. Address: Box 424, The FOUNDRY, Cleveland 13, Ohio.

SUPERINTENDENT

For large production grey iron foundry in Middlewest. Excellent opportunity. Address: Box 426, The FOUNDRY, Cleveland 13, Ohio.

STEEL FOUNDRY METALLURGIST

Experienced. Acid electric melter, low and high alloys. Capable of assuming responsibility of chemical and physical laboratories, heat treatment, sand control and gamma ray. Address: Box 383, The FOUNDRY, Cleveland 13, Ohio.

PRODUCTION FOUNDRY MANAGER

Midwest. Capable handling practical, as well as office end on grey iron squeezer and medium floor work. Must be experienced foundry man. Foundry well equipped with good volume of business. Address: Box 433, The FOUNDRY, Cleveland 13, Ohio.

PRACTICAL FOUNDRYMAN

With experience of snap flask work to go into our foundry for one month and make suggestions that will help increase production. Address: Box 350, The FOUNDRY, Cleveland 13, Ohio.

MOLDING FOREMAN

Grey iron squeezer and floor work. Midwest. Must be expert molder with supervisory experience. Foundry well equipped with large volume of orders. Address: Box 434, The FOUNDRY, Cleveland 13, Ohio.

STEEL FOUNDRY SUPERINTENDENT

We need an experienced practical man in centrifugal pump, turbine and pressure castings for plain carbon and high alloy work. Must be able to direct and train molders, coremakers and close-up men. Must be thoroughly competent to rig work on molding machines, set up shop standards and piece work rates. Metal experience helpful but not essential. Give full experience, personal data and salary expected in first letter. A permanent, profitable connection for the right man. Union contract with open shop. Address: Box 439, The FOUNDRY, Cleveland 13, Ohio.

Manufacturer's Agents

REPRESENTATIVE WANTED

Old established grey iron foundry specializing in castings to 75 pounds desires a commission representative in New England—New York—New Jersey and Eastern U. S. A. Write.

THE SUSQUEHANNA CASTING CO., INC.
WRIGHTSVILLE, PA.

Accounts Wanted

MANUFACTURER'S REPRESENTATIVE

Established 22 years in Detroit, member of S.A.E. etc., wishes immediate contact with gray iron foundry, permanent mold and sand cast aluminum and die casting companies wishing high-volume production business. Urgently request reply giving complete information, including capacities, number of employes, equipment and type of work you can handle, including intake manifolds. Address: Box 422, The FOUNDRY, Cleveland 13, Ohio.

ACCOUNTS WANTED

Qualified foundry equipment sales organization desires additional accounts, covering Ohio, Indiana and Western Pennsylvania. Prefer repeating items. Address: Box 445, The FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

PERSONNEL DIRECTOR

Experienced in personnel and labor relation problems of foundry, steel mill or manufacturer. Good educational background supplemented by practical experience on seniority, contract and employee-employer relations. Address: Box 437, The FOUNDRY, Cleveland 13, Ohio.

YOUNG FOUNDRY MANAGER

Fourteen years' experience in all phases of foundry work, supervision and management in both production and jobbing plants. An engineering graduate well qualified to give best results in any foundry assignment, steel and high alloy. Presently employed but desires more progressive employer. Address: Box 401, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Practical molder and core maker with 26 years' experience as foundry superintendent. All classes of jobbing, rollover and squeezer. Mix by analysis. At present employed. Address: Box 869, The FOUNDRY, Cleveland 13, Ohio.

PATTERNMAKER

Fast and accurate. Layout work including blueprints, estimating costs and checker. Wood and metal patterns to suit your foundry conditions. 35 years' experience including four years' molder apprentice. Fifteen years' experience in charge of job shop with 20 men. Will go anyplace. Take charge and work on bench, small shop or supervise large shop. Prefer shop where can do a day's work and not be checked for doing too much work. Address: Box 375, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

20 years' foundry experience, 11 years' supervision, molding, coremaking, cupola, sand, cleaning, 4½ years' superintendent, jobbing and production, cost and quality minded. Age 44, married. Address: Box 378, The FOUNDRY, Cleveland 13, Ohio.

SUPERINTENDENT—GENERAL FOREMAN

Thirty years' practical experience on medium and heavy jobbing work. Ten years' foreman and superintendent in gray iron shop pouring 30 to 40 tons per day. Would like to make change at once. Address: Box 323, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY FOREMAN

With 30 years' experience in steel or high-nickel alloy castings would like position in Middle West. Can furnish best of references. Address: Box 443, The FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

FOUNDRY SUPERINTENDENT OR MANAGER

Mechanical engineer with 20 years' experience in positions of top responsibility desires permanent position in modern gray iron foundry. Thoroughly familiar with bench, roll-over and blowing cores; squeezers, split pattern machines, and sand slingers and modern cupola equipment. Successful in handling cost, loss and labor relations. Address: Box 393, The FOUNDRY, Cleveland 13, Ohio.

STEEL FOUNDRYMAN
SUPERINTENDENT OR ASSISTANT

Thirty years' experience in steel. Can train molders and melters. Experienced in production of medium and heavy castings. Can rig head and gate for sound castings and for lowest cleaning cost. My record and ability can be proven for all phases of a steel foundry. Address: Box 341, THE FOUNDRY, Cleveland 13, Ohio.

STEEL FOUNDRYMAN

Supervisory capacity with 20 years' experience in all phases steel foundry. Producing steel castings ranging from 1 pound to 3 tons. Good knowledge of foundry equipment, plant layout, foundry methods and high speed mechanized production. Thoroughly familiar with heading and gating and rigging of patterns for machine production, also sand slinger. Married. Age 43. Address: Box 432, The FOUNDRY, Cleveland 13, Ohio.

FOREMAN

Nonferrous foundryman with 30 years' experience from molder to instructor to foreman. Desires position in progressive foundry. Have specialized in training molders and trouble shooter. Thoroughly experienced in all phases of foundry operation. Salary optional. Address: Box 419, The FOUNDRY, Cleveland 13, Ohio.

FOREMAN

Can take full charge of small or medium size gray iron foundry. Western states preferred. Address: Box 431, The FOUNDRY, Cleveland 13, Ohio.

MELTER

Electric furnace. Experienced on both acid and basic practice. Carbon and alloy steels. Best of references. Available at once. Address: Box 423, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY MANAGER OR SUPERINTENDENT

Available soon, experienced in heat resisting, corrosion resisting and carbon steel. Diversified experience, expert in foundry process engineering, age 41.

BOX 425
THE FOUNDRY CLEVELAND 13, OHIO

PATTERNMAKER

Widely experienced and fast patternamaker—wood or metal—charge of shop—trouble shooter—instructor. Convert apprentices into competent journeymen in two years. Address: Box 374, The FOUNDRY, Cleveland 13, Ohio.

PATTERNMAKER

35 years on bench—wood and metal. First class mechanic and can make matchplates. Do metal and wood work including core blowing, rigging and driers. Address: Box 376, The FOUNDRY, Cleveland 13, Ohio.

FOREMAN

Art, bronze or molder. High grade, experienced in all art bronze castings. Interested in position in Chicago district only. Address: Box 339, The FOUNDRY, Cleveland 13, Ohio.

COREROOM SUPERINTENDENT

Production shop preferred—automotive. Have experience and ability to handle any core room producing large or small work and operating all types of core making machinery. Have specialized in sand mixing. Address: Box 405, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRYMAN

25 years' experience, patterns and castings. Dimensional quality control foundry trouble-shooter. Engineering, pattern, casting and casting layout departments liaison. Address: Box 388, The FOUNDRY.

Classified Advertising

Positions Wanted

MANUFACTURING EXECUTIVE

Presently employed, desires to make a connection with a progressive manufacturer or foundry, preferably in the East. Twenty-four years' experience in the manufacture of cast iron heating equipment and commercial gray iron castings both light and heavy. Have always held top positions such as office manager, purchasing agent, assistant superintendent and plant manager. Age 44, married and of good character. Address: Box 392, The FOUNDRY, Cleveland 13, Ohio.

ALUMINUM PERMANENT MOLD FOUNDRY ENGINEER

TWENTY-FIVE YEARS' EXPERIENCE AIRCRAFT PARTS OR ANY INTRICATE WORK. FULL OR PART TIME. OHIO AREA OR METROPOLITAN NEW YORK LOCATION PREFERRED. ADDRESS: HAROLD C. HAASE, 557 SOUTH FOREST DRIVE, WEST ENGLEWOOD, NEW JERSEY.

SUPERINTENDENT GENERAL FOREMAN

Twenty-five years' practical experience with ten years as molder and 15 years as foreman and superintendent of both jobbing and productive shop on castings up to 20 ton. Well versed in all departments including cupola, mixing metal, rigging and gating for fast production and best quality castings. Cost minded and can handle men. Address: Box 390, The FOUNDRY, Cleveland 13, Ohio.

GENERAL MANAGER

Mature, profit-minded, dependable. Has successfully managed four companies—two taken out of the red. Available for service shortly with medium-size company requiring reliable directing ability in management, sales finance and production. Excellent experience, foundry, machine and related lines. Address: Box 871, The FOUNDRY, Cleveland 13, Ohio.

OPEN HEARTH SUPERINTENDENT OR MELTING FOREMAN

Thirty years' experience making all kinds of steel for castings or ingots, basic or acid. Familiar with construction and operation of furnaces. Can furnish very best of references. Address: Box 354, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY CONSULTANT

With 45 years actual foundry experience specializing in problems of mechanical foundries, regulating production and reducing scrap. Address: Box 429, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Twenty-two years in machine tool foundries and others requiring cast iron of similar high quality. Superintendent and assistant for five years. Age 39. Now employed. Address: Box 442, The FOUNDRY, Cleveland 13, Ohio.

SUPERINTENDENT GENERAL FOREMAN

Twenty-six years' practical experience. Fourteen years as molder, 12 years as foreman and superintendent of both jobbing and fast productive grey iron shops pouring light and medium weight castings. Well versed in all departments including cupola. Experienced in rigging and gating for fast production and best quality castings on rollover, squeezer or floor. Can handle men and am cost minded. Address: Box 444, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY MANAGEMENT NOTE:

Do you want a progressive smooth running foundry with low scrap and good castings? Get a competent superintendent, experienced in iron, steel and manganese. Further details if interested. Address: Box 438, The FOUNDRY, Cleveland 13, Ohio.

IRON FOUNDRY SUPERINTENDENT

Practical foundryman, technically trained. Experienced all phases production by partial and complete mechanization. Superintendent first class foundry producing 125 tons daily. Experienced setting up an organization and handling labor. East or Middle West. Address: Box 436, The FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

FOUNDRY EXECUTIVE

Practical foundryman, married, age 43. 23 years' experience in all phases of foundry operations, in iron, steel and high manganese. Have successfully operated foundry producing 70 tons daily in castings from 1 to 40,000 lbs. with low scrap loss. Have experience in plant management with record as good organizer. No preference as to location. At present employed in Mid-west. Address: Box 396, The FOUNDRY, Cleveland 13, Ohio.

Open Capacity

Wood and metal pattern experimental and model work. Let us estimate on your pattern equipment.

CONGERVILLE PATTERN SHOP

P. O. Box 107 CONGERVILLE, ILLINOIS

Phone—DANVERS ILL. 3-317

OPEN CAPACITY

For all kinds of wood and metal patterns. Experimental, model and production. Master patterns a specialty. Let us estimate on your pattern requirement. Give us a trial and let's get acquainted. ADDRESS: MUNSON MILL MACHINERY COMPANY, 200 SEWARD AVENUE, UTICA, N. Y.

OPEN CAPACITY

Moved into our new modern foundry. Have open capacity for light and medium gray iron, brass, bronze and aluminum castings. Address: O.K. FOUNDRY CO., 1005 E. 9th Street Road, Richmond, Va.

OPEN CAPACITY

Gray iron and aluminum castings. Specialize in gas burners and thin section castings. Address: INDUSTRIAL FOUNDRY & MFG. CO., SCHOOLCRAFT, MICHIGAN.

AVAILABLE CAPACITY

Our foundry has open capacity to supply small and medium size gray iron castings. Send sample. Address: OREGON CASTINGS CO., RD 3, Lititz, Pa.

OPEN CAPACITY

For small sand cast aluminum castings. 6 molding machines available. Good castings at reasonable prices. Send samples. ADDRESS: STANLEY ALUMINUM FOUNDRY, P.O. BOX 260, OCONTO, WISCONSIN.

OPEN CAPACITY

We are ready to make most all kinds of small patterns both mounted and cast plates. We will submit castings from all wood patterns for your approval. We have over thirty years' experience. Give us a trial and let's get acquainted. Address: MARTIN'S PATTERN & TOOL WORKS, ASHLAND, OHIO.

OPEN CAPACITY

Central Pattern Works. Wood and Metal patterns. 1109 E. Pratt St., Baltimore 2, Md.

Opportunities

COKE SAVINGS OF DOLLARS

per day is possible in nearly every foundry—reduction of total time of heat—resulting in quality metal. Get our report on your cupola. Semisteel is the purest—strongest—hottest metal made in cupola. Are you making it? Our system is an investment that brings returns worth many times the fee. Distance is no bar and remember you don't wade thru hundreds of pages only to learn the information has no bearing on the making of quality castings or how to keep your losses down. Advice is concise and a real treat for every man connected with the foundry. Information free.

McLAIN'S SYSTEM INC.

236 E. NORTH AVE. MILWAUKEE, WIS.

OPPORTUNITY

We can furnish at any point slack, fibre and tight barrels; also fibre and steel drums. Address: BUCKEYE COOPERAGE COMPANY, 3807 ORANGE AVENUE, CLEVELAND 15, OHIO.

Employment Service

SALARIED POSITIONS
$3,500—$35,000

If you are considering a new connection communicate with the undersigned. We offer the original personal employment service (39 years recognized standing and reputation). The procedure, of highest ethical standards, is individualized to your personal requirements and develops overtures without initiative on your part. Your identity covered and present position protected. Send only name and address for details.

R. W. BIXBY, INC.

101 DUN BLDG. BUFFALO 2, N. Y.

SALARIED PERSONNEL

$3,000—$25,000. This reliable service, established 1927, conducts confidential negotiations for high-grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Address: JIRA THAYER JENNINGS, 241 ORANGE STREET, NEW HAVEN 10, CONN.

Foundries For Sale

NONFERROUS FOUNDRY FOR SALE

Highly profitable business. Well established over a period of 25 years. Fully equipped and producing high grade brass, bronze and aluminum castings for the best accounts in Cleveland, Ohio. 9000 sq. ft. of space. Annual sales $300,000. Owners wish to retire.

BOX 409

THE FOUNDRY CLEVELAND 13, OHIO

SMALL GRAY IRON FOUNDRY

Near Canton, Ohio. 24" cupola, 4 squeezers, rollover, pattern draw, core blowers, wheelabrator, pig and scrap. Address: Box 420, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE OR LEASE

Cast steel and gray iron foundry, 38,000 square feet floor area. Central Pennsylvania location. Address: HARTLAND STEEL AND FOUNDRY CORPORATION, WEATHERLY, PA.

Classified Advertising

Foundries For Sale

FOR SALE

Pattern shop and aluminum foundry. Doing a good business. Price about $35,000 at inventory. Property with sale in California. Address: Box 421, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

Gray iron foundry in Western Pennsylvania. Backlog of orders. Plenty of good raw materials. Reason for selling: Owners need capital. Excellent opportunity. Address: Box 441, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE OR LEASE

Completely equipped gray iron foundry immediately available. Western Pennsylvania, Pittsburgh district. Two cupolas, one No. 7 Whiting, one 36" collieau. Positive pressure blowers, four 5ly tumbling barrels, Pangborn sand blast room, Pangborn sand blast barrel. Natural gas available. Pattern shop with wood-working power tools. Sheet metal shop with equipment. Address: Box 410, The FOUNDRY, Cleveland 13, Ohio.

Wanted-To-Buy

MIXERS WANTED

Used Simpson Intensive Sand Mixers. State size, condition and lowest cash price for immediate acceptance. Address Box 578, The FOUNDRY, Cleveland 13, Ohio.

WANTED

Stationary sand slinger and plate feed 220 volts, 60 cycle with 19" head and at least 16' swing radius. Beardsley & Piper preferred. Address: SWEDISH CRUCIBLE STEEL CO., 8561 BUTLER AVE., DETROIT 11, MICH.

PATTERNSHOP WANTED

Part interest or buy outright pattern shop. Capable mechanic—wood and metal and can make own matchplates and core equipment. Address: Box 377, The FOUNDRY, Cleveland 13, Ohio.

WANTED

Small nonferrous foundry of approximately 3,000 ft. Location in Chicago or vicinity. Address: Box 428, The FOUNDRY, Cleveland 13, Ohio.

WANTED

Two ton gas driven lift truck. Prefer one with shovel attachment for handling sand. Address: SWEDISH CRUCIBLE STEEL CO., 8561 BUTLER AVE., DETROIT 11, MICH.

WANTED

One (1) small sized Brinnell hardness tester. Address: Box 413, The FOUNDRY, Cleveland 13, Ohio.

WANTED

Beardsley & Piper stationary sand slinger. In replying, give date and serial number, also condition. Address: STEDMAN'S FOUNDRY & MACHINE WORKS, INC., AURORA, INDIANA.

WANTED

Wheelabrator, not smaller than 36-42 or equivalent Pangborn tumblast. Must be in good condition. Address: Box 430, The FOUNDRY, Cleveland 13, Ohio.

FOR RENT

Gray iron foundry, open span 56' x 178' floor-vacant-ideal location, Northeastern Pennsylvania. Two (2) cupolas, capacity 20 ton per day, core ovens, 20 ton electric crane, air compressor and power service. Good labor conditions, excellent railroad facilities, siding and switching direct to foundry building, ample storage and yard space. Good size pattern, machine, plate and forge shops now operating on premises. Address: Box 440, The FOUNDRY, Cleveland 13, Ohio.

For Sale

FOR SALE

One (1) Modern Equipment Co. 1000# geared, covered, cylindrical ladle, like new—$150.00. Address: IROQUOIS FOUNDRY CO., RACINE, WISCONSIN.

For Sale

FURNACE ATMOSPHERE GAS GENERATORS

6—G.E. 500 CFH Exothermic G-4, low ratio.

1—Westinghouse Endo Gas 500 CFH

1—G. E. Drycolene

4—L & N temperature indicators and recorders, 4 point, printing type. Catalog 40354. Condition excellent. New $615.....$160.00 each

1—L & N indicator controller and recorder, Program type, 3 point, 1 point control. New $1,005 ..... $250

5—Wheelco Limitrols. New $350.....$75 each

5—G.E. Induction heating control, 220 volt, 210 KW, 3 phase, type CR-2604-H1 and H2. New $871 ..... $215 each

5—Low pressure blowers 100 CFM at 8 Oz. North American with Leeds & Northrup valve control. New $250.....$50 each

2—Transformers, Ajax Hultgren Salt Bath 25 KW ..... $200 each

2—Aluminum melting furnaces, Campbell-Hausfeld Type 1650. New approx. $1,000..... ..... $175 each

PHONE OR WIRE MR. WARNER
LIBERTY PLANERS, INC.
HAMILTON, OHIO

FOR SALE

TURBO BLOWERS

(2) 2200 cfm @ 2½ lb. Spencer Turbo Blowers with 40 HP 3 phase 60 cycle 3600 RPM totally enclosed fan cooled motors.

1675 cfm @ 2½ lb. Spencer Turbo Blower 30 HP 3 phase 60 cycle 3600 RPM totally enclosed fan cooled.

1400 cfm @ 16 oz. Spencer with 220/440 volt 3 phase 60 cycle motor.

150 cfm @ 3 lb. Spencer with 5 HP 3600 RPM motor.

PRESSURE BLOWERS

2500 cfm @ 7 oz. Sturtevant with 15 HP 3/60/220/440 volt motor.

2300 cfm Clarage with 2 HP 3/60/220 volt motor.

1400 cfm @ 8 oz. Robinson with 5 HP, 3/60, 3600 RPM motor.

1100 cfm @ 16 oz. Sturtevant.

450 cfm @ 6 lb. A & B with 30 HP motor.

250 cfm @ 12 oz. GE with 2 HP motor.

THE MOTOR REPAIR & MFG. CO.
1522 HAMILTON AVENUE
CLEVELAND 14, OHIO

FOR SALE

American Wheelabrator tumblast barrel 27" x 36" model A, serial 45833—Price $2500.

Wheelabrator cabinet stationary type work area 28" wide, 34" deep x 40" high. Price $1175.

Wheelabrator No. 1 multitable—Price $1000.

Pangborn rotoblast table 6' LF—Price $1200.

American dust tube collector No. 65, 5640 cloth area—Price $900 with electric motor and blower.

M. ELSTEIN
141 MANGIN ST. NEW YORK 2, N. Y.

SURPLUS EQUIPMENT SALE
CUPOLA AND CHARGING EQUIPMENT

One Whiting Cupola, 108" shell, 30' High	$ 5,000.00
One 3 Ton Shepherd-Charging Equipment, together with scale car and 8 charging buckets	10,000.00
One 5 Ton Yard Crane, Erie Construction Company, span, 50 feet Also 200 foot craneways for 5 ton yard crane	12,000.00
One Positive Type Blower made by Wilbraham Green Blower Company, together with 75 horsepower, 3 phase, 220 volt motor	4,000.00
One No. 4 Demmler Core Blowing Machine	1,500.00
One Mold Conveyor made by Bartlett & Snow. Conveyor contains 72 cars and 12 sand chutes together with belt for distributing sand	16,000.00
One Pangborn Roto Blast Table	2,000.00

Where is and as is, subject to prior sale.

COLUMBIA FOUNDRY COMPANY
3400 WALNUT STREET
McKEESPORT, PENNSYLVANIA
TELEPHONE
PITTSBURGH EXCHANGE HOMESTEAD 4176
McKEESPORT EXCHANGE McKEESPORT 4176

For Sale

SURPLUS LABORATORY & PRODUCTION EQUIPMENT

AVAILABLE AS A RESULT OF CONSOLIDATION OF OUR CLEVELAND AND CHICAGO LABORATORIES.

IN CHICAGO:

1.) Southwark-Tate-Emery Universal Hydraulic Tensile Testing Machine built by Baldwin Locomotive in 1945. 60,000 lb. capacity. Also accessory equipment.

2.) Lindberg Heat Treating Furnace for laboratory use. Built in 1942. Also Leeds & Northrup furnace temperature control unit.

3.) Charpy Impact Tester—40 foot/pound capacity.

4.) Rotoclone—made by American Air Filter Co. in 1946. Complete with switches, gauges, etc.

5.) Three Fisher Crucible Furnaces — oil-fired and nose tilting type. Complete with controls.

IN CLEVELAND:

One 36" dia. Sturtevant exhaust fan . . . One American Blower with 17" dia. blade . . . One V belt drive exhaust fan . . . One American Blower, blade type, 34" dia. with Western Electric motor . . . One Universal Blower, 12" dia. and connected directly to motor . . . Eleven Ajax Melting Furnaces. Nearly all are tilting type without leads.

One Buffalo Blower with 18" intake and direct drive. One Universal Chain Hoist, Five ton with sheave, 2 hooks. One Hercules Chain Hoist, 10 ton with sheave and two hooks. One Spencer Turbo, 24-oz. 3600 rpm, with 30 hp General Electric motor. Four Bradley Bird Cage Washbowl circles.

Spectrographic Laboratory Equipment — Three Hayes Scientific Calculating boards. One Dietert Film Dryer. Two Galvonometers. One G. E. high voltage 10KVA transformer. One G. E. high voltage transformer, 100/120 volt primary, 30 kva secondary. One Electric Power Construction Co. transformer, 10 kva for high voltage arc discharge. One bank of resistors 48 light, 200 watt. One bank of resistors, 120 light, 100 watt.

Chemical Laboratory Equipment—One Globar muffle furnace. Three Electrodes, platinum, anode—Slomin. Four electrodes, platinum, cathode—Slomin. Two electrodes, platinum, anode—Braun. Two electrodes, platinum, cathode — Braun. One Evelyn Photoelectric photometer, with filters, tubes, etc. Seven tilrimeters—vacuum tube voltmeters. Six Pyrex bottles—2½ to 5 gallon capacity. One, 2-section, 3"x5" card file. Two Cenco Tensiometers. One Triplett meter. One General Electric model X-ray film dryer.

Controls—Three Wheelco Limitrols. Twelve Wheelco Capacitrols. Eight Leeds & Northrup Micromax Recorders.

Motors—Fifteen electric motors ranging from one to fifteen hp. Nearly all three phase, 60 cycle. Made by General Electric and Westinghouse.

Miscellaneous—Three Prater Pulverizers. One Sutton-Steel gravity air separator. One Raymond Impact Pulverizer. One hammer mill type Pulverizer—American. Eleven magnetic rolls of various sizes. One Buffalo exhaust fan. One unlined tilting furnace shell, 36" x 36". One North American Blower with 5 hp motor. One Syntron Feeder. One Three-yard concrete mixer. AC and DC generators, and other additional equipment not listed also available.

THE ABOVE SURPLUS EQUIPMENT IS OFFERED FOR SALE AT LOW PRICES. FURTHER INFORMATION IS AVAILABLE BY WRITING OR PHONING DIRECT TO PLANT WHERE MATERIAL IS LOCATED.

APEX SMELTING CO.

6700 GRANT AVE. 2537 WEST TAYLOR ST.
CLEVELAND 5, OHIO CHICAGO 12, ILL.
PHONE: DIAMOND 0060 PHONE: TA 9-1100

Classified Advertising

For Sale

FOR SALE

1—Royer Sand Separator & Blender, Model NC-2 with motor, 220 Volts—2 phase, 60 cycle.

1—Shakeout table, Type 148-A, 3′ x 7′ with 5″ vibrator and automatic oiler (New Haven make)

1—Tabor Column jar squeezer, 10″ cylinder, 18 x 20″ table.

All the above slightly used.

1—Beardsley & Piper Sand Slinger with 5 ton feeder, complete with motors and bucket conveyor.

This sand slinger is in fair condition and ready for use.

1 each Adams Snap Flasks, straight 12″ x 14″—12″ x 16″—12″ x 18″—12″ x 20″—13″ x 17″—14″ x 18″—all 5″ Copes 4″ drags, with "V" pins and ears. In original package—never used. Price reasonable.

LAFAYETTE FOUNDRY PRODUCTS CO.
2235 N. BODINE ST. PHILADELPHIA 33, PA.

GOOD USED EQUIPMENT

Sly Dust Collecting System, consisting of 3 Sly #62 Dust Filters to handle 15,000 CFM each. Motors 220/440 volt, 3 phase, 60 cycle. Was erected, but not used.

2—Chicago Pneumatic Air Compressors, 225 CFM capacity, 100# pressure, 2 stage.

6—ton Northern, 46′ span, 2 motor, 230 volt Bridge Crane. Rope floor controlled.

10—ton Shaw, 39′6″ span, 3 motor, cage controlled, 230 volt DC Bridge Crane.

50 KW, General Electric Motor Generator Set.

10 HP, P&H, ball bearing Crane Motor, 230 volts DC, 675 RPM.

60 HP Westinghouse, Type SK, compound wound, 230 Volt DC Motor, 680 RPM.

IRA C. JORDAN,
2508 EAST BELLEVIEW PLACE,
MILWAUKEE 11, WISCONSIN

FOR SALE

1—NEW ELECTRIC LEAD MELTING FURNACE

Hoskins type FR 118 consisting of split type insulated cover—power transformer, 220 volt, 3 phase, 60 cycle primary, 73 volts secondary.

Complete automatic temperature control equipment for the above.

1—REBUILT COMPRESSOR

Serial #4529¾. Size 15 & 9¼ x 12, Class XCB-2 Air End Complete with Automatic 5 step clearance control, cylinders, platen, rod assemblies, new style channel valves, force feed rotary drive lubricator.

Performance

Piston Displacement C.F.M.	513-586
Speed, RPM	210-240
Air Pressure, pounds	100-100
B.H.P. required	85- 97
Actual capacity, C.F.M.	432-499

The V-belt drive is complete, consisting of Compressor sheave, motor drive and necessary ropes, catalog No. 9-D-240 15.0-54.0; Compressor speed 240 RPM, Motor speed, 875 RPM, Center distance between sheave 62.3″.

1—Westinghouse Induction Motor, 100 HP Ball Bearing

1—Allen Bradley #640 100 HP 220 Volt, 3 Phase, 60 Cycle Serial #352790, Semi-Automatic Starter

1—Ingersoll Rand Air Aftercooler, Size 5, Class and Symbol 28-PL-12, Operation pressure 100#

1—Air Storage Tank

LINE MATERIAL COMPANY
12th AND MADISON AVE.
SOUTH MILWAUKEE, WIS.

For Sale

FOR SALE

8—Tabor Stationary Jar Squeezers
15—80 lb. oil fired, crucible-type melting furnaces with covers, Hauck Burners and mixing valves
5—500 lb. oil fired Fisher Stationary Aluminum melting and holding furnaces with Hauck Burners and mixing valves
1—Tilting Furnace, 400 lb. crucible, equipped for gas firing
1—Royer Shakeout machine with motor
1—Lindberg Heat Treating Furnace — Type 2828-EH
2—Tannewitz Metal cutting saws, 36″ and 42″ wheels respectively
500—feet of 16″ Roller Conveyors
250—feet of 24″ Roller Conveyors

OLD COLONY FOUNDRY COMPANY
EAST BRIDGEWATER,
MASSACHUSETTS

FOR SALE

2—8 ton Rotary Air Hoists.
1—6′ Simpson Muller & Loader with new wheels & bottom plate.
36—Hand Ladle Shanks—New.
2—Slag Buggies—New.
2—1 ton Buggy Ladles.
1—36″ x 60″ Floor Jolt Machines.
1—Roots Blower #6 20″ x 70″ 38.5 Displacement. Excellent Condition.
1—New Haven Direct Pressure 48 Barrel complete with Drive 7½ H.P. Motor 3-60-220.
2—30″ Dia. x 52 large Sly Tumbling Barrels.
2—24″ Dia. x 64 large Sly Tumbling Barrels.
1—Square Tumbling Barrel 40 x 40 x 23″ deep.

TAYLOR & CO., INC.
680 MORGAN AVE. BROOKLYN 22, N. Y.
EVERGREEN 8-2630

FOR SALE

Unused Ingersoll-Rand compressor for sale. Type XRE-2, 15½ x 9½ x 10, direct connected, motor driven, 659 C.F.M. 100 pound displacement. Address: SEALED POWER CORPORATION, MUSKEGON, MICHIGAN.

USED FOUNDRY EQUIPMENT

(4) Loomis and Serloff guilt squeezer machines —$75 each
(1) No. 6 35″ Champion blower—$35
(1) 45″ Boston blower—$50
(1) No. 4 Sturtevant blower—$35
(1) 24″ No. 4 Buffalo blower—$35
(1) No. 2 V American blower—$35

DORNBACK FURNACE & FOUNDRY CO.
724 E. 103rd ST.
CLEVELAND 8, OHIO

FOR SALE
MOLDING MACHINES

2—J & J #610-B Portable Jolt Rollovers, tables 30″ x 24″, 10″ Draw, Air Operated, Condition—GOOD
1—J & J #681-C Portable Jolt Strip, Table 30″ x 25″, 8″ Draw, Air Operated, Condition—GOOD
1—Tabor Pedestal Type, Hand Ram, Hand Rollover, Pattern Draw, Table 20″ x 14″, Air Vibrator, Practically New
1—Osborn Model 76J Jolt Squeeze, Table 17″ x 26″, Air Operated, Condition—GOOD
Several Royer Sand Blenders, DC Current, Condition—FAIR

T. B. WOOD'S SONS CO.
CHAMBERSBURG, PA.

FOR SALE

200 H.P. Air Compressor—Ingersoll-Rand—Late Model.
Dust Tube Collector—4800 CFM—$350.00.
Dust Tube Collector—for 36 x 42 American Wheelabrator or equivalent—$650.00.
Sly #4 Sand Blast Mill—Like New—$300.00.
3000 lb. Crescent Platform Lift Truck—with ready power unit—$650.00.
712 J Osborn Jolt Strip & Squeeze machine—$950.00.

We invite your inquiries on all foundry equipment

BALCHER MACHINERY SALES
1884 S. COMPTON ROAD
CLEVELAND HEIGHTS 18, OHIO

FOR SALE

Approximately 300 lineal feet 6″ Louden super track monorail 2000# capacity with hangers, plates, bolts, etc.; 3 switches; 10—500# track ladles and bails; 12—4 wheel trolleys; a complete iron handling system in good condition. Price only $750.00 for immediate sale. Address: KEEN FOUNDRY CO., GRIFFITH, INDIANA.

For Sale

FOR SALE

MOLDING MACHINES—
6—Yoke type powered squeeze, flask lift, split pattern "Tabor" molding machines with 13″ cylinder, open end head, for 13 x 18 flask.
1—Osborn #42, portable coremachine.
2—Yoke type jar squeeze, 10″ cylinder, 18 x 18 table, "Tabor" molding machine.

FURNACES
Furnace, elec. heat treat. "Electric Furnace Co." 14′ L x 6′ w x 6′ hi. 250 KW-220 V complete with controls.
Furnace, heat treat "Industrial-Circ Air" gas fired car type, 14′ L x 6′6″ w x 6′ hi., complete.
Furnace, annealing - continuous, "Industrial Heating" 26′6″ x 6′ w x 16″ hi., gas fired, complete.
4—Furnaces, melting "Bellevue" 550# capacity.
Monarch 300# Crucible Tilting Furnace, with mechanism less motor.
10—Bohn Oil Fired Brass melting furnaces, pit type, for No. 80 crucible.

BLOWERS
American No. 6V with motor.
G.E. 36 oz., 1600 CFM with 20-24 HP motor, 3600-3-60-440.
5—American Sirocco No. 4V.
Buffalo forge size 6, less motor, Ser. #17943.

MISCELLANEOUS EQUIPMENT
3—"Standard" Snagging Grinders, double end, 18″ wheel.
Motor, 25 hp. 1200/3/60/220-440—need rewinding.
286—Steel Squeezer Flasks 12″ x 18″ cope & drag.
463—Tabor flasks 12″ x 18″ cope & drag.
1—Snap Flask 10″ x 20″ cope & drag.
1—Snap Flask 14″ x 19″ cope & drag.
2—Snap Flasks 14″ x 16″ cope & drag.
1—Snap Flask 13¾″ x 18¾″ cope & drag.
1—Snap Flask 14″ x 14″ cope & drag.
1—Snap Flask 12″ x 20″ cope & drag.
1—Snap Flask 12″ x 22″ cope & drag.
450—Bottom Boards (wood) 12″ x 18″.
50—Bottom Boards (wood) 13⅜″ x 13⅜″.
50—Bottom Boards (wood) 11¾″ x 21¾″.
34—Squeezer Flask Uplifts.
250—Flask Weights, 12″ x 18″.
3 pr Crucible Tongs for No. 80 crucible.
3—Core Setting Tables (revolving).
4—Carrying Shanks for No. 80 Crucible.
"Sly" Sand Blast System 8′ x 8′ x 7′ high with 6′ turntable and exhaust system.
2—"Hausfeld" Mag-Tilt Melting furnaces, 1200 lb. cap. complete.
2—Shells for Mag-Tilt melting furnaces.
Molding machine, "Arcade" portable hand draw and jolt 16″ x 12″ plate.
Sand blast room, "Sly" 10′ x 10′ compl. with tank, blower and motor.
2—Shakeout machines, "Stoney Vibrator" #D-5.
Porta trough belt conveyor, mod. 334-T 18″ w x 35′ 1 with 5 hp. motor, conveyor is mounted on two wheel truck.
Vacuum Cleaner, portable "Spencer Turbine" with 3 HP motors.
Shear, alligator type "Hendley & Whittenmore" #46 less 2 hp. motors.

BOHN ALUMINUM & BRASS CORP.
1400 LAFAYETTE BLDG. DETROIT 26, MICH.

FOR SALE

One brand new model AS vertical centrifugal casting machine, 5 H.P., driving unit with speed range of 0-600 R.P.M. for operation on 220 volt, 60 cycle, 3 phase power, complete with control cabinet. If interested please reply—

BOX 435
The FOUNDRY CLEVELAND 13, OHIO

FOR SALE

1—American Wheelabrator Multi Tablast BM-66200, Serial #A 50689
1—American Wheelabrator Tumblast 27″ x 36″ Serial #A 48421
1—50 HP Gardner-Denver Compressor Model WBH
1—40 HP Gardner-Denver Compressor Model WBE
1—Pallet Conveyor, Jeffrey No. 24, 360 ft. of track, motors, 59 cars, elevation above floor 24″, cars are spaced 72½″, car tops are 48″ wide x 60″ long of ⅜″ steel hydraulic rams pushes molds off conveyor to shake-out.

OLD COLONY FOUNDRY COMPANY
EAST BRIDGEWATER,
MASSACHUSETTS

Classified Advertising

For Sale

SHIPMENT FROM STOCK

MULTIPLE HEARTH FURNACES

2—Continuous gas fired Multiple Hearth Furnaces, air cooled. Mfg. by Allis Chalmers. 24'-7" dia. x 33' high. Complete with mixers, heater unit, base and power drives.
(1 Never Used—1 Slightly Used).

STACKS

3—5'3" dia. x 110' high, ⅜" and $\frac{5}{16}$" plate with reinforcing bands every 10'8".

BLOWERS

12—Axial Flow Fans 10000 CFM, 3" SP.
29—Axial Flow Fans 8000 CFM, 3" SP.
12—Axial Flow Fans 3000 CFM, 3" SP.
3—1000 CFM ⅜" SP with motors.
6—1200 CFM 13.9" SP with motors.
3—3300 CFM ¾" SP with motors.
1—5750 CFM 7½" SP American.
6—10000 CFM 1.9" SP Everdur Blades Type R Buffalo.
4—18000 CFM 7¾" SP V-Belted Type SE, #12 American.

AIR CONDITIONING UNITS

2—75 ton, Chrysler Airtemp, Unused.
1—20 ton, Frigidaire.

FULLER KINYON SYSTEM

1—Type H5 Pump with Motor and Feed Hopper, hi-low control system, 250'4" pipe and 8—3-way motorized valves.

WELDERS

300 and 400 amps. G.E. & Hobart. Rebuilt and guaranteed. New 1943.

STEEL STORAGE BINS—HOPPER TYPE

1—66' long, 16' wide, 10'6" high straight side, 6'6" height of hopper, 6 compartments.
1—11' long, 8'9" wide, 10" high straight side, 6'6" height of hopper, 2 compartments.
1—88' long, 12' wide, 7' high straight side, 6' height of hopper, 8 compartments.
3—34' long, 12' wide, 6'6" high straight side, 9' height of hopper, 4 compartments.
1—22' long, 11'6" wide, 7'3" high straight side, 6'3" height of hopper, 4 compartments.

CONVEYORS—BELT

24", Flat 30' centers and drive.
24", Barber Greene Troughing, 18" centers and drives.
30", Flat 65' centers with stainless steel belt.

ELEVATORS—BUCKET

68' centers, single 825 chain, 10" x 6", MI Buckets, steel encased.
48' centers, single 825 chain, 14" x 7", MI Buckets, steel encased.

TANKS

750 gal. vert. 5' x 8' x ½", open.
2300 gal. hor. 5' x 15' x ½".
Blow-off 6'6" x 10', 100# hydrostatic test, ASME code.
4000 gal. hor. 6' x 20' x $\frac{5}{16}$" (2 NEW).
5000 gal. hor. 6' x 23'7" x $\frac{5}{16}$" (NEW).
5000 gal. hor. 6'1" x 24' x ½".
42000 gal. 12'6" x 45', $\frac{5}{16}$" & ¼".

BOILER PLANT—Complete, Erie City, 604 HP, 180 PSI, ASME code and Natl. Board. Pulverized coal fired.

HEAT & POWER CO., INC.
70 PINE ST. DIGBY 8-0373 NEW YORK 5, N. Y.

FOR SALE

Used Universal tensile testing machine. Good condition. Type MP-10, motor driven, hydraulically operated. Address: Box 334, The FOUNDRY, Cleveland 13, OHIO.

FOR SALE

New heavy duty motorized rod cutter, 65 cuts per minute; capacity: ¾ inch round hot rolled steel. Brand new. $890.00 f.o.b. Cleveland. Address: The Federal Foundry Supply Co., 4600 East 71st St., Cleveland 5, Ohio.

FOR SALE

Dual, 5' x 8' Simplicity shakeout—one unit variable speed. Hopper and conveyor apron feeder included. Make offer. Address: Box 418, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

Romph No. 1 gas fired aluminum melting furnaces tilt type, 1000 lb. to 30,000 lb. capacity. Excellent condition.
15 ton shaw box crane, never used, 26 ft. 10½" span, floor controlled, 3/60/440 motorized with or without 75 ft. runway—7½ ton hand operated bridge. Approx. 33 ft. span.
Dust arrestors—dry type—American Air Filter mfg. from size 20 to 80, 3 HP to 20 HP 3/60/220/440. Practically new—cheap.
All items subject to prior sale FOB Cincinnati, Ohio.

237 MILL ST., CINCINNATI 3, OHIO
CHERRY 2217
ALLIED SALES

FOR SALE

Two (2) side door charge Heroult electric arc furnaces including shell, roof, mast, winch motor assembly, electrode assembly, tilting mechanism, tilt control panel stand. No transformer, no furnace control panel and no flexible power leads. In excellent condition. May be seen in operation until about March 7th.

One (1) Ajax 50 pound induction furnace, complete with control panel and required capacitors. No motor-generator nor bus bars are included. In excellent condition.

BOX 416
The FOUNDRY CLEVELAND 13, OHIO

FOR SALE

Coleman drawer type core oven with maxon premix burner and motor complete. Address: PHILLIPS PATTERN WORKS, P.O. BOX 1143, MUNCIE, INDIANA.

FOR SALE

(1) Ingersoll-Rand, type FS347, 4000 CFM, 125# pressure, 3500 RPM, direct connected motor driven centrifugal air blower with 30 HP motor, 220-3-60. No starter.
(1) Ingersoll-Rand, type G, 2200 CFM, 16 oz. pressure, direct connected motor driven centrifugal air blower with 15 HP motor, 220-3-60. No starter.

BOX 411
THE FOUNDRY CLEVELAND 13, OHIO

FOR SALE

1—American Foundry Equipment sand cutter. Completely overhauled. Gasoline motor driven. Will straddle sand pile 72" wide. Address: OHIO MALLEABLE IRON CO., COLUMBUS, OHIO.

FOR SALE

3 Marschke 3-speed swing frame grinders. #SSJ x 4, 18" x 3" x 8" wheel, full belt guard—10 HP 220V 3 ph. 60 cycle 1750 RPM motor and control. Grinders in excellent condition. Address: HART & CROUSE CORP., BOX 395, UTICA, N. Y.

FOR SALE

AMERICAN WHEELABRATOR SANDCUTTER

MODEL AM 50" WIDE

Machine in good running order but was replaced with larger machine. Used machine may be seen running if desired.

HERSHEY MACHINE & FOUNDRY CO.

MANHEIM, PA.

For Sale

EQUIPMENT FOR SALE

MOLDING MACHINES
3—75J Osborn Jolt Squeeze
2—SPO #611-B Stationary, Oscillating, Jolt, Squeeze Strippers
1—SPO #4½ JHS Air Jolt Hand Strip
1—Tabor Plain Squeeze, Strain Rod Type
3—Mumford 3" Cyl. Core Jolt, with 20" x 15" Table
4—Osborn #36 core box drawing machines.
BLOWERS FOR CUPOLAS AND FURNACES
2—Spencer Turbine Cupola blowers 4100 CFM 16-oz, 25 HP direct connected motor
6—#805 General Blowers, 5 HP, 3/60/220, 1400 CFM at 8-oz. pressure
Maxon-Premix Blowers for Gas, ¼ to 1 H.P.
1—Connersville double geared rotary cupola blower, rated 24 cu. ft. per rev., maximum delivery 6200 CFM.
METAL MELTING EQUIPMENT
2—Hausfeld 1000# Aluminum Capacity Furnaces, Barrel Type, Open Flame, Oil Fired
2—Hausfeld 2000# Aluminum Capacity Furnaces, Barrel Type, Open Flame, Oil Fired
3—Stationary Gas Fired #60 Crucible Furnaces, with ¼ H.P. Maxon-Premix Blowers
2—Monarch-Rockwell Rotating, 500# Brass, Oil New 32" to 41" Dia. Shell Cupolas made to order.
TUMBLING MILLS AND SAND BLAST
2—Pangborn No. 2 GH direct pressure type sandblast barrels, motor driven. Complete units.
1—Pangborn LE 6 ft. sandblast table, continuous sand feed, motor driven. Complete unit.
1—Pangborn LE 4 ft. sandblast table, continuous sand feed, motor driven. Complete unit.
1—Pangborn Sand Blast Unit including generating tank, shot cleaner, bucket elevator. Suitable for use with room.
MISCELLANEOUS
4—Heavy duty flexible shaft grinders 2 HP.
30—1000 lbs. Capacity Budget Electric Hoists.
5—Low Lift Electric Trucks, 2000 lbs. capacity and up. Riding Operator Style.
1—Heavy Duty Back Geared Sprue Cutter, 1½" square knives, T & L Pulley Drive.
1—Fay & Egan 14" blade revolving, double arbor, tilting table, variety saw with roller table.
Miscellaneous Electrical and Gravity Conveyor Systems.

CLIFTON MACHINERY CO.
1023 W. 6th ST. CINCINNATI 3, OHIO
PHONE PARKWAY 7812

FOR SALE

LANLY RACK TYPE OIL-FIRED TO ACCOMMODATE TWO 4' x 6' x 6' RACKS. OVERALL SIZE 13' WIDE x 8' DEEP x 12' HIGH. CAN BE CONVERTED FOR GAS-FIRING. ADDRESS: BOX 406, THE FOUNDRY, CLEVELAND 13, OHIO.

FOUNDRY EQUIPMENT

1—Model 30 B. & P. Speedmullor
8—275J Osborn Jolt Squeezers
1—American Wheelabrator 42" x 42"
2—Model "S" B. & P. Screenarators
1—Gardner-Denver Air Compressor, 130 cu. ft. actual—V belt Drive with motor.
Demmler Core Blowers, size #1 & #2

RAY P. SCULLY
SCULLY MACHINERY & EQUIPMENT CO., NOT INC.
767 MILWAUKEE AVE. CHICAGO 22, ILL.
PHONE: CANAL 6-0314

ROTARY POSITIVE BLOWERS IN STOCK TODAY!!!

28x30	6700 C.F.M.	7 lbs.
20x60	6150 C.F.M.	2 lbs.
20x30	4465 C.F.M.	3½ lbs.
16x24	3210 C.F.M.	5 lbs.
16x21	2125 C.F.M.	5¾ lbs.
16x48	4100 C.F.M.	2 lbs.
14x36	2500 C.F.M.	1½ lbs.
12x18	1500 C.F.M.	4½ lbs.
10x15	880 C.F.M.	3½ lbs.
10x7½	465 C.F.M.	10 lbs.
8½x29¾	1000 C.F.M.	2 lbs.
8x20	685 C.F.M.	2 lbs.
8x15	520 C.F.M.	4 lbs.
8x12	433 C.F.M.	3½ lbs.

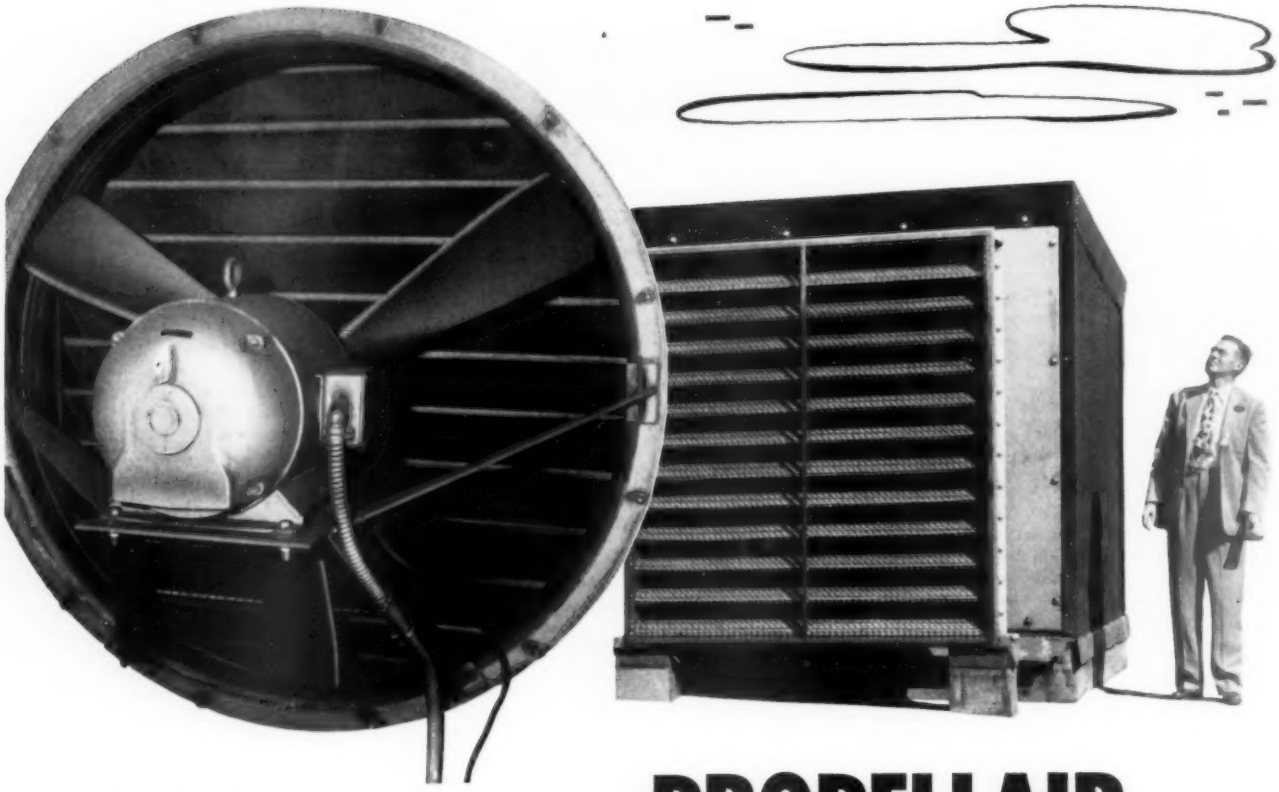
And many smaller Roots-Connersville and Sutorbilt Rotary Positive Blowers. Spencer—Sturtevant—North American and General Blower Turbo Blowers. Also Steel Plate Dust Exhausters.
SEND US YOUR INQUIRIES.
WM. W. MEYER & SONS
SKOKIE—ILLINOIS
8309 NILES CENTER ROAD

USED EQUIPMENT FOR SALE

1 Pangborn car and 8'0" dia. table type shot blast with dust collecting system.
1 Beardsley & Piper 16'6" radius, stationary type hydraulically controlled speed slinger having 22" head and ramming capacity of 2000# of sand per minute.
2 Osborn airholt, air rollover draw machines having 14,000# capacity for flasks 130" long 62" wide.
2 70 ton steel sand hoppers with apron conveyors designed for supplying sand to molding machines.
1 shakeout floor hopper 51'4¾" long x 12'0" wide at floor, 24" at conveyor.
1 shakeout apron conveyor 72'0" long x 36" wide, complete with drive mechanism.
1 60" dia. revolving screen 17'0⅛" long complete with support frame and drive mechanism. Screen designed for handling shakeout sand.
1 magnetic belt conveyor 24" wide having 17'0⅜" centers. Complete with drive mechanism.
1 bucket elevator 37'2" high with 14" x 8" buckets designed to handle 70 tons of sand per hour.
1 bucket elevator 33'6" high with 14" x 8" buckets designed to handle 70 tons of sand per hour.
1 belt conveyor 24" wide x 345'0" long and one belt conveyor 24" wide x 182'0" long constructed in one common structural steel frame operated in opposite directions. Complete with 2 drive mechanisms, idlers, pulleys, and takeups.
1 450 ton double sand bin 45'0" long, 25'0" wide, 20'6" high having sloping bottoms with 36" wide 44'0" long apron conveyors. Complete with drive mechanism.
1 reversible belt conveyor 24" wide 50'0" centers having capacity of 78 ton per hour constructed on structural steel support frame.
2 100 ton steel sand storage bins, 17'6" long, 12'0" wide x 22'0" high with sloping bottom having apron conveyor 36" wide 17'8½" centers. Complete with drive.
2 inclined 24" troughing belt conveyor having 29'10" centers complete with belt, idlers and drive mechanism.
1 flat belt conveyor 24" wide x 136'10" long constructed on structural steel frame complete with belt, idlers, and drive. Designed to operate at 147 ft. per minute.
1 24" flat belt conveyor 62'5" centers constructed in structural steel frame designed to operate at 147 ft. per minute. Complete with belt, idlers, and drive mechanism.
1 24" flat belt conveyor 23'4½" centers designed to operate at 147'0" per minute. Complete with belt, idlers, 3 standard discharge plows and drive mechanism.
1 145 ton steel storage bin 23'0" long, 12'0" wide x 22'3" high with apron conveyor mounted horizontally at bottom. Apron conveyor is 42" wide 26'7½" centers. Complete with drive mechanism.
1 24" belt conveyor partly troughed and partly flat, 121'0" centers. Complete with belt, idlers, drive mechanism and 6 air cylinder operated plows.
2 sand hoppers having 16" x 24" double undercut gates, capacity 60 cu. ft. of sand each.
2 sand happers having 10½" sq. open bottoms, capacity 37½ cu. ft. each.
2 U. S. Electric Tool Company swing frame grinders, wheel size 20" x 2½" x 10", equipped with 10 HP motors.
3 Foundry Equipment Company mold drying ovens 14'0" long x 11'4" wide x 5'8" high. Door opening 10'0" x 3'0" high. Gas fired external recirculating system. Complete with motors and controls.
1 open top mold drying oven 9'0" long x 6'0" wide.
1 Clearfield sand mixer with air operated discharge disk, 10,000# total mulling weight with dust hood. Complete with 75 HP motor and starter.
1 6'0" x 9'0" Herman rollover pattern draw molding machine.
1 5'0" x 8'0" Herman pattern draw stripping machine.
1 spillhopper 21'10" long x 20" wide constructed of steel plate together with grating at floor level.
1 18" wide belt conveyor 23'0" centers to deliver sand from spillhopper to screen. Complete with drive.
1 Beardsley & Piper gyratory screen 36" x 54" complete with motor and structural steel frame.
1 bucket elevator 32'0" center, 20" x 40" casing of 12 gauge steel, complete with drive & motors.
2 850 cu. ft. round storage bins with plate feeders, drive and motors.
1 18" wide including belt conveyor 28'0" centers, complete with drive and motors.
1 Buffalo Forge air washer suitable to handle 34,200 cfm air complete with sludge ejector, pump, fan, and motors.
1 Buffalo Forge air washer suitable to handle 38,800 cfm air complete with sludge ejector, pump, fan, and motors.
1 special core machine with conveyor loading.
6 400 amp DC welding machines.
4 heating furnaces with removable conveyor, 1—12'0" x 4'0", 1—24'0" x 4'0", 2—11'0" x 6'0".
1 Simplicity 5'0" x 8'0" dual shakeout machine with motors and drives.
Motors and electrical equipment on the above are for 440 volt, 3 phase, 60 cycle current.
1 10 ton overhead electric traveling crane 83'3" span with 40'0" lift for 230 volt DC power.
1 Osborn air operated jolt rollover pattern draw molding machine, flask length 130" x 30". Jolt capacity 12,000#, including hydraulically leveling device and runout car.
1 15 ton single leg gantry crane 27'0" span, 25'6" lift. To operate on 230 volt DC current.
2 Westinghouse 25 HP, 725 RPM motors for 440 volt, 3 phase, 25 cycle current.
1 Northern Pump Company hydraulic pump delivering 28 gallons per min. @ 3,000# pressure.
1 Ingersoll mill cutter grinder cap. 5" to 30" dia. Belt driven.
Fairbanks 12" vertical head drill, 11" x 11" table. Belt driven.
1 B.F. Barnes 20" vertical drill 16" dia. table. Belt driven.
1 7" overhang 2 spindle drill 44" x 14" table. Belt driven.
1 Osborn mold. machine air jolt rollover 130" x 42", #413-3 Ser. No. 9650.
1 14" floor type D.E. Grinder. Belt driven.
1 Lodge & Shipley 18" x 10" engine lathe. Belt driven.
1 Special steel forge furnace, gas fired—5'0" wide x 4'3" deep x 3'9" high to top of arch (outside dim.)
1 Gould & Eberhardt 24" heavy duty shaper with vise, Ser. No. 5985, belt driven.
1 W. F. & J. Barnes 28" vertical sliding head drill 27" dia. table. Belt driven.
1 Oliver drill point grinder.
1 1 ton Chicago Pneumatic motor air hoist.
1 7½ KW, 25/62.5 cycle frequency changer set, complete with 7½ HP motor, 7½ HP generator and control panel.
1 30 HP, 25 cycle, 230 volts, DC, 475 RPM Bullock motor.
1 15 HP, 25 cycle, 230 volts, DC, Bullock motor.
1 15 HP, 25 cycle, 240 volts, DC, Bullock motor.
1 15 HP, 25 cycle, 230 volts, 3450 RPM, DC, General Electric motor.
1 25 HP, 25 cycle, 230 volts, 575 RPM, DC, Westinghouse motor.
1 2 HP, 25 cycle, 230 volts, 830 RPM, DC, Westinghouse motor.
1 2 HP, 25 cycle, 230 volts, 850 RPM, DC, Westinghouse motor.
1 2 HP, 25 cycle, 230 volts, 750 RPM, DC, Westinghouse motor.
1 25 HP, 25 cycle, 1000 RPM, 230 volts, DC, Bullock motor.
1 25 HP, 25 cycle, 1050 RPM, 230 volts DC, Bullock motor.
1 15 HP, 25 cycle, 1000 RPM, 230 volts, DC, Westinghouse motor.
1 25 HP, 25 cycle, 725 RPM, 440 volts, AC, 25 Westinghouse motor.
1 40 HP, 25 cycle, 525/1500, 220 volts, DC, Westinghouse motor.
1 10 HP, 25 cycle, 1250 RPM, 230 volts, DC, General Electric motor.
1 4½ HP, 25 cycle, 1200 RPM, 220 volts, DC, Westinghouse motor.
1 20 HP, 25 cycle, 1450 RPM, 440 volts, AC, General Electric motor.

The Symington-Gould Corporation

Depew, New York



You're looking at both sides of PROPELLAIR

. . . Showing Heat the Way Out!

Here's a powerful PROPELLAIR installation. Fan blades are 60" in diameter, powered by 15 h.p., 1150 RPM Robbins & Myers Uni-Shell motor. It's one of 12 atop this Eastern power plant. They're mounted in 9'-tall, metal penthouses where the fans exhaust through heavy-duty, automatic shutters protected by heavy grill work. Each 60" airfoil propeller moves 78,800 C.F.M., for a total air movement of 950,000 C.F.M. This is ample boiler and turbine room ventilation, even for peak loads.

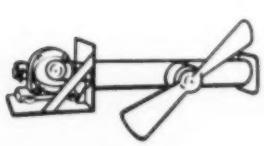
LEARNED FROM THE AIRCRAFT WING

More than just fans, Propellair airfoil blades create air movement with both sides . . . the back even more than the front. Like an airplane wing, air flow is uniform over full fan area because the whole blade works . . . not just the tip.

ADAPTED TO YOUR NEEDS

There are Propellair fans for every purpose . . . cooling men or machines . . . removing dust, fumes, odors, moisture, heat. Made for ducts, hoods, roofs, windows and with pedestals or stands. Sizes range from 12" to 60" diameter, with capacities up to 88,000 C.F.M. Several are shown below.

DISCUSS YOUR VENTILATING PROBLEMS WITH EXPERIENCED PROPELLAIR ENGINEERS. NO OBLIGATION.



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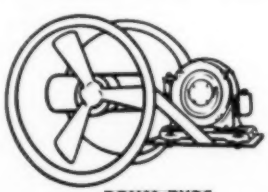
FOR DUCTS AND STACKS



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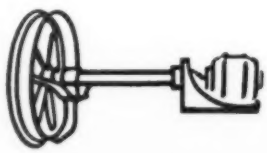

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DIRECT-CONNECTED,
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"Moving Air is our Business"

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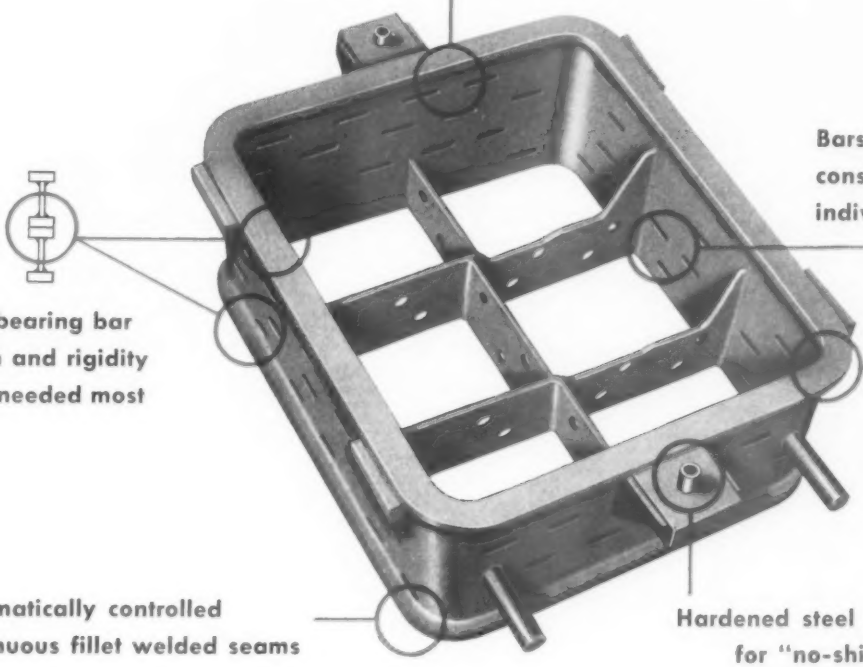
THE REASONS WHY *Industrial's* THE BUY


Fabricated of Lightweight Hi-Tensile Alloy Steel
Bars and other components constructed to customer's individual specifications
Full width bearing bar for strength and rigidity where it is needed most
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Automatically controlled continuous fillet welded seams
Hardened steel pins and bushings for "no-shift" alignment

- All Flasks Normalized and Stress Relieved
- Low Cost
- Quick Delivery

Modifications or variations of the fabricated flask section pictured available in all sizes and shapes to fit individual needs.

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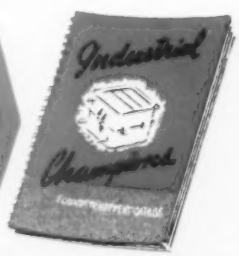
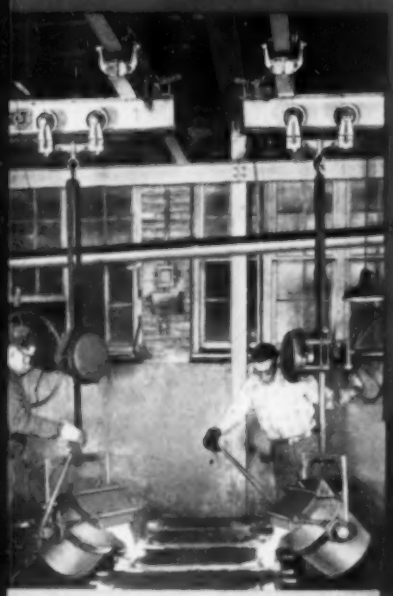


Foundry Equipment BUILT STRONGER TO LAST LONGER

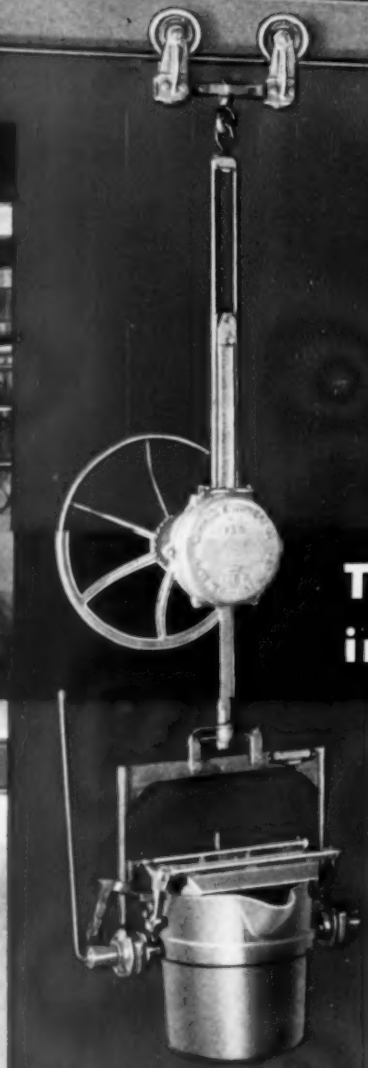
INDUSTRIAL FABRICATING, INC.

TELEPHONE 6781

816 HALL STREET • EATON RAPIDS, MICHIGAN

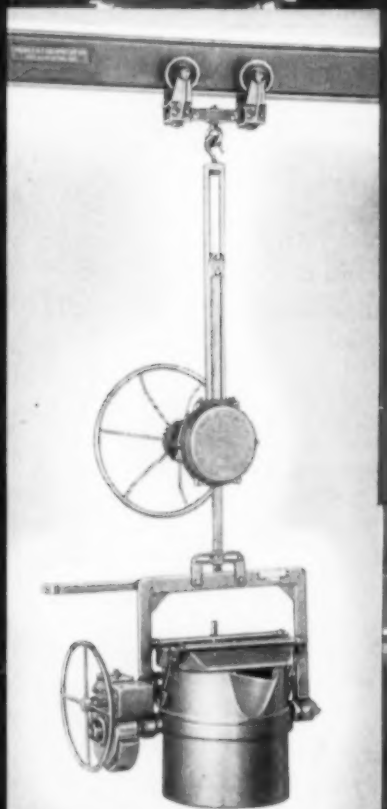


The ORIGINAL and still FIRST... in MECHANIZED POURING!



MODERN "FA" Pouring Device and Tapered Covered Pouring Ladle suspended from a MODERN Trolley-Type Pouring Crane.

Since the first elementary pouring device was introduced by MODERN, some 30 years ago, MODERN EQUIPMENT Engineers have pioneered important advancements in mechanized pouring. Today, MODERN Pouring Devices are used in all types and sizes of foundries for the distribution and pouring of molten metal . . . swiftly, safely, at low cost! Together with MODERN Overhead, Trolley-Type Pouring Cranes . . . and MODERN Distributing and Pouring Ladles . . . they provide *completely mechanized pouring*, at high efficiency, with a minimum of manual effort.



MODERN Straight-sided, Covered, Geared, Distributing Ladle and "FA" Pouring Device suspended from a MODERN Monorail.

MODERN EQUIPMENT CO.

PORT WASHINGTON, WISCONSIN

Ask the MODERN Sales Engineer in your area, or write direct, for suggestions on a Completely Mechanized Distributing and Pouring System for Your Foundry.

CUPOLAS • CUPOLA CHARGERS • LADLES OF ALL TYPES • POURING DEVICES • METAL POURING SYSTEMS • CRANE AND MONORAIL SYSTEMS • ELECTRIC C

Got a Casting problem?

For more than half a century, Stevens has specialized in the manufacture and application of *quality-controlled* foundry facings. During that time we have accumulated a most representative case history file of successful accomplishment.

Today, this broad background of specialized experience and knowledge is concentrated in a most complete line of "job-qualified" core and mold coatings, any one or more of which might be the answer to your specific casting problem.

Whether you're pouring gray iron, brass, bronze, aluminum or magnesium, you will find it worthwhile to discuss your casting operations with a Stevens representative.

You will find he is qualified in every way to help you benefit through the proper application of Stevens "job-qualified" foundry facings. He is capable of proving his recommendations in terms of results in your plant, on the job, if you will permit him to do so.

Should it be determined that your requirements are such that they cannot be answered by our standard core or mold coatings, he will enlist the assistance of Stevens foundry specialists, laboratory staff and facilities in developing a formulated facing that answers your particular need. Let a Stevens representative *show you the way* to better casting production through better foundry facings. You would be wise to call him in today.

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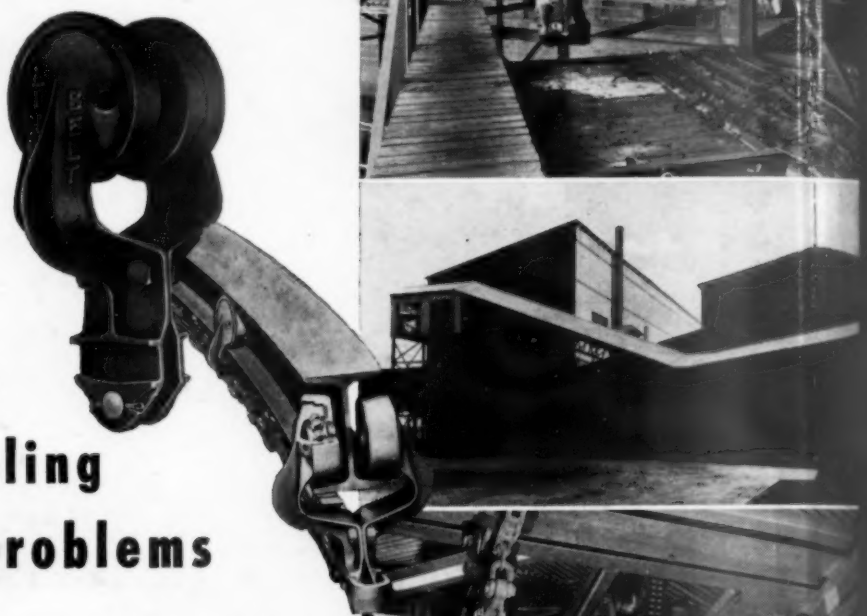
FOUNDRY EQUIPMENT AND SUPPLIES DIVISION

Castings take the "Easy Way" at OLIVER FOUNDRY—CHARLES CITY PLANT

Left: Core knockout for cylinder blocks and transmission cases. Right: Half-way point on castings cooling conveyor in outside steel gallery. (Round trip takes about 1½ hours.)



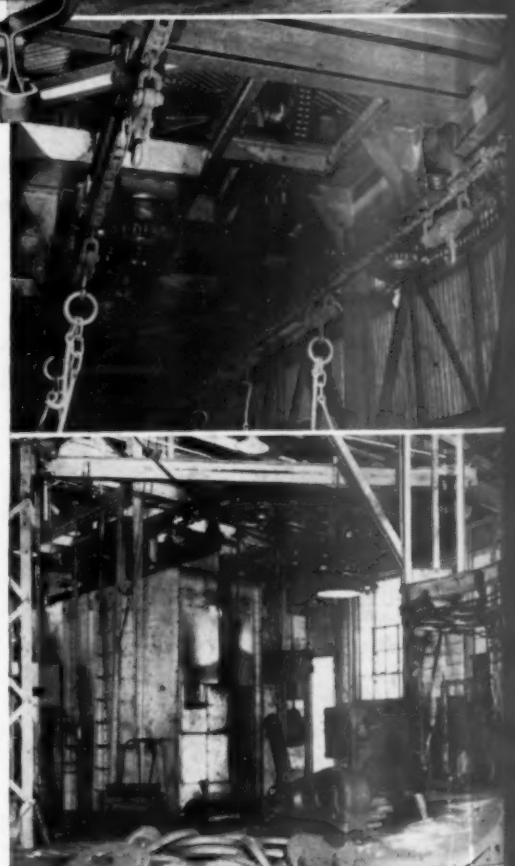
LINK-BELT

overhead conveyors solve transport, cooling and core knockout problems

Another foundry using Link-Belt overhead conveyors to cut costs, expedite production and make it easier for labor, is that of the Oliver Corporation at Charles City, Iowa.

A conventional foundry trolley conveyor is used to cool large and small castings over a path that takes them outside the building through steel gallery furnished by Link-Belt. Castings are dragged over a core knockout to remove core sand without manual transfer. An auxiliary Link-Belt conveyor of same design handles castings through the shot-blast room. Floor space is made available for production, giving double use of ceilings or roof trusses. Trolley conveyors can travel irregular paths, in two planes, at predetermined speeds to suit production.

The Link-Belt drop-forged-steel overhead conveyor trolley has extreme simplicity of design . . . low maintenance and high load bearing capacities . . . adequately sealed . . . quickly installed in existing or new systems . . . users say it is remarkably trouble-free in operation. Ask for literature.



LINK-BELT COMPANY

Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8. Offices in Principal Cities. 11,337

Top Center: General outside view of steel gallery. Bottom Center: Underside view of tandem drive unit. Both boosters driven from one variable speed drive arrangement located in gallery. Bottom: Auxiliary Link-Belt trolley conveyor handling castings to shotblast unit.

THE SYMBOL OF QUALITY LB LINK-BELT

LINK-BELT CONVEYORS

AND PREPARATION MACHINERY

MANUFACTURER'S ASSOCIATION, INC. FOUNDRY EQUIPMENT